The

Nalco #71

PAPER MILL ANTIFOAM

- ★ **CONTROLS** foam and bubble formation over wide pH range—4.0 to 9.5!
- ★ **ELIMINATES** bubble formation on wires.
- ★ **EASY** to mix and feed.
- ★ **NO EFFECT** on other materials in the furnish.
- ★ **ECONOMICAL**—Average cost less than 15¢ PER TON of paper produced.

NALCO 71 not only positively eliminates foam and bubble formation in paper machine systems without affecting the furnish, but it also *stays in the water.* This means that remarkably small dosages of 71 efficiently prevent foam overflows, wadding, uneven caliper and other foam difficulties. Churning of Jordans, action of stock pumps and the flow of stock—the very things that cause foaming in untreated systems—all promote better action of Nalco 71!

Complete information on Nalco 71—and on other Nalco Chemicals for paper manufacturing use will be furnished upon request. Write today for prompt action on a permanent solution for your foaming problems.

NATIONAL ALUMINATE CORPORATION
6232 West 66th Place
Chicago 38, Illinois
Canadian inquiries should be addressed to Alchem Limited, Burlington, Ontario, Canada

THE Nalco SYSTEM
Serving the Paper Industry through Practical Applied Science

THE FUTURE OF YOUR PRODUCT IS IN THESE HANDS

wet-strengthen your paper with the

UFORMITE resins

All over America, *housewives* pass judgment on your frozen food wraps. Lack of wet-strength and pick-resistance can bring a barrage of complaints—and rejections.

Safest, least expensive way to satisfy these ultimate consumers is to wet-strengthen your paper with the UFORMITE resins. As little as $4 per ton boosts wet Mullen values 300%, raises dry Mullen and fold values 10% to 30%, and increases wet rub and scuff resistance, and wet and dry tensile. No special equipment, pretreatment or additional processing is needed.

If you make food wraps, bags, towels, reproduction or printing papers, glassine, or twisting tissues—tell us something about your furnish, and we will send suggestions, technical literature, and samples, if you say so.

OTHER CHEMICALS FOR THE PAPER INDUSTRY

RHOZYMES B8 and E-5—for enzyme conversion of starch.

TAMOL N—for effective pitch control—a dispersing agent for pigments.

TRITONS—Surface-active agents with a score of uses in paper manufacture—in caustic cooking of cotton fiber, as a dispersing agent for pigments and metallic soaps, emulsion-type coatings.

The Hydrosulfites—Reducing agents for stripping color from rag stock or for bleaching pulp.

HYAMINES—Deodorants for paperboard and glue bactericides.

UFORMITE, RHOZYME, TAMOL, TRITON, HYAMINE are trademarks, Reg. U.S. Pat. Off. and in principal foreign countries.

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

Washington Square Philadelphia 5, Pa.

The Resinous Products Division was formerly The Resinous Products & Chemical Company

This CURLATOR INSTALLATION PAID FOR ITSELF in 6 MONTHS OPERATION

IN WOOD SAVINGS ALONE IN A NEWSPRINT MILL†

This is not a Paul Bunyan story. It has been accomplished and is being done today in actual mill operation. For example last year, by curlating pulp, one newsprint mill saved over 6,500 cords of pulpwood—more than enough to pay for several Curlators. In addition to this outstanding record more than enough sulphur, coal and limestone was saved to pay all this Curlator's operating and maintenance costs.

And while curlation was making possible this saving in pulpwood and increasing the yield, quality standards were absolutely maintained. It will pay any paper manufacturer to look into curlation and its possibilities. The many thousands of dollars that curlation saved in one mill can also be saved in many other newsprint mills.

†Name of mill furnished on request.

Why not find out what a Curlator can do for you?

MAIL THIS COUPON TODAY FOR DETAILS OF CURLATOR *Savings*

CURLATOR* *Corporation*

565 BLOSSOM ROAD · ROCHESTER 10, NEW YORK

*T.M. Reg.— Curlator Corporation, Rochester, N. Y.

CURLATOR CORPORATION
Rochester 10, N. Y.

I would like to be shown what Curlator can do for me.

NAME_____

ADDRESS_____

CITY_____ STATE_____

NEW LOW COST of SODIUM CHLORITE Permits Wider Use

and NEW convenient form . . . a 50% solution now available in tank car quantities . . .

● Increased production—using improved methods—has made possible new low prices on Mathieson Sodium Chlorite. And, with the new, easily handled 50% solution, it is now economically feasible to use this powerful and unique oxidizing agent in many more processes.

Sodium Chlorite, by releasing chlorine dioxide, bleaches cellulosic fibers without causing degradation. Consequently, wood pulp and textiles can be made whiter with greater tensile strength retention than with any other known processing agent.

Stable, non-hygroscopic, water-soluble Mathieson Sodium Chlorite is available for industrial use as a dry, straw-colored crystalline powder packed in 100 lb. drums. The new form—a 50% aqueous solution—is available in tank car quantities. Write today for complete information, samples and prices. Mathieson Chemical Corporation, Mathieson Building, Baltimore 3, Maryland.

For Diversity, Capacity and Flexibility, rely on Mathieson for these basic heavy chemicals:

Sulphuric Acid	Ammonium Sulphate
Processed Sulphur	Nitrate of Soda
Soda Ash	Chlorine
Caustic Soda	Calcium Hypochlorite
Bicarbonate of Soda	Sodium Chlorite
Ammonia	Chlorine Dioxide

Mathieson CHEMICALS

8374

SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 32 • NUMBER 6 • SEPTEMBER, 1950

Features . . .

National Gypsum 25th anniversary marked with open house at 23 plants 588

New Green Bay Mill makes semichemical paperboard 604
by Richard W. Porter

Mechanical devices reduce hazards 611
by Ora Hazen

Paper and paperboard making—VII 612
by Harry Williamson

Twelve years of progress at National Container Corp., Jacksonville 614
by K. M. Guest

New Harmac mill producing unbleached kraft 620

Automatic pH control improves quality at Newton Falls 627
by J. W. Morrow and J. E. Shepard

Manufacture of cellulose pulps from straw 628
by S. I. Aronovsky

News . . .

Industry—Allied News 588-602

Association News 630

Safety News 632

Names in the News 635-642

Necrology 642

International Review 645

Departments . . .

Editorial 579

Current Comment 581

Financial 584

Pictured Highlights 603

Paper Sketches 629

Coming Events 630

Foreign Abstracts 645

Convention Papers . . . Abridged 658-660

New Products 662-666

New Literature 668-672

Current Market Quotations 674-675

Index to Advertisers 676-677

THE PAPER INDUSTRY is indexed regularly in **Engineering Index** and **Industrial Arts Index.** An index to each volume is issued annually by the publisher as a part of the April number.

Copyright 1950 by Fritz Publications, Inc.

Published monthly by:
FRITZ PUBLICATIONS, INC.
Edward B. Fritz (1869-1939), Founder

Publication Staff:

President and General Manager
A. SCOTT DOWD

Vice President and Treasurer
A. C. L. FRITZ

Secretary
A. C. BRUCE

Editorial Director
RICHARD W. PORTER

Editor
BESSE MERRITHEW

Production Manager
EDGAR C. FARREN

Circulation Director
G. E. VON ROSEN

Circulation Field Representative
C. J. ELWELL

Advertising Representatives:

CHICAGO 5: **John D. Henderson,** 59 East Van Buren Street, Wabash 2-3543.

NEW YORK 20: **L. S. van Nydeck,** 9 Rockefeller Plaza, Circle 7-3085.

BOSTON 16: **Meade & Company,** 471 Statler Building, Liberty 9677.

CLEVELAND: **L. M. Perkins,** 1199 Dorsh Road, South Euclid 21, Ohio, **Evergreen 1-3232.**

LOS ANGELES 14: **Nourse Associates,** 412 West Sixth Street, Vandike 5875 (Murray Bothwell).

SEATTLE 4: **Nourse Associates,** Empire Building, Eliot 1769, (Arthur G. Neitz).

THE PAPER INDUSTRY—founded in 1919—known as "The Paper Industry and Paper World" from June, 1939, through December, 1949, assumed its original title with the January, 1950, issue.

Published at 404 North Wesley Avenue, Mount Morris, Illinois.

Address all correspondence to Editorial and Executive Office, 59 East Van Buren Street, Chicago 5, Illinois.

Member: Audit Bureau of Circulation, The Associated Business Publications.

Entered as second class matter December 13, 1948, at the post office at Mount Morris, Illinois, under the Act of March 3, 1879.

Subscription rates: United States, U.S. Possessions, and Canada, $3.00 for one year, $5.00 for two years, $6.00 for three years. All other countries, $8.00 for one year, $18.00 for three years.

APPLETON Felts

for UNIFORMITY...

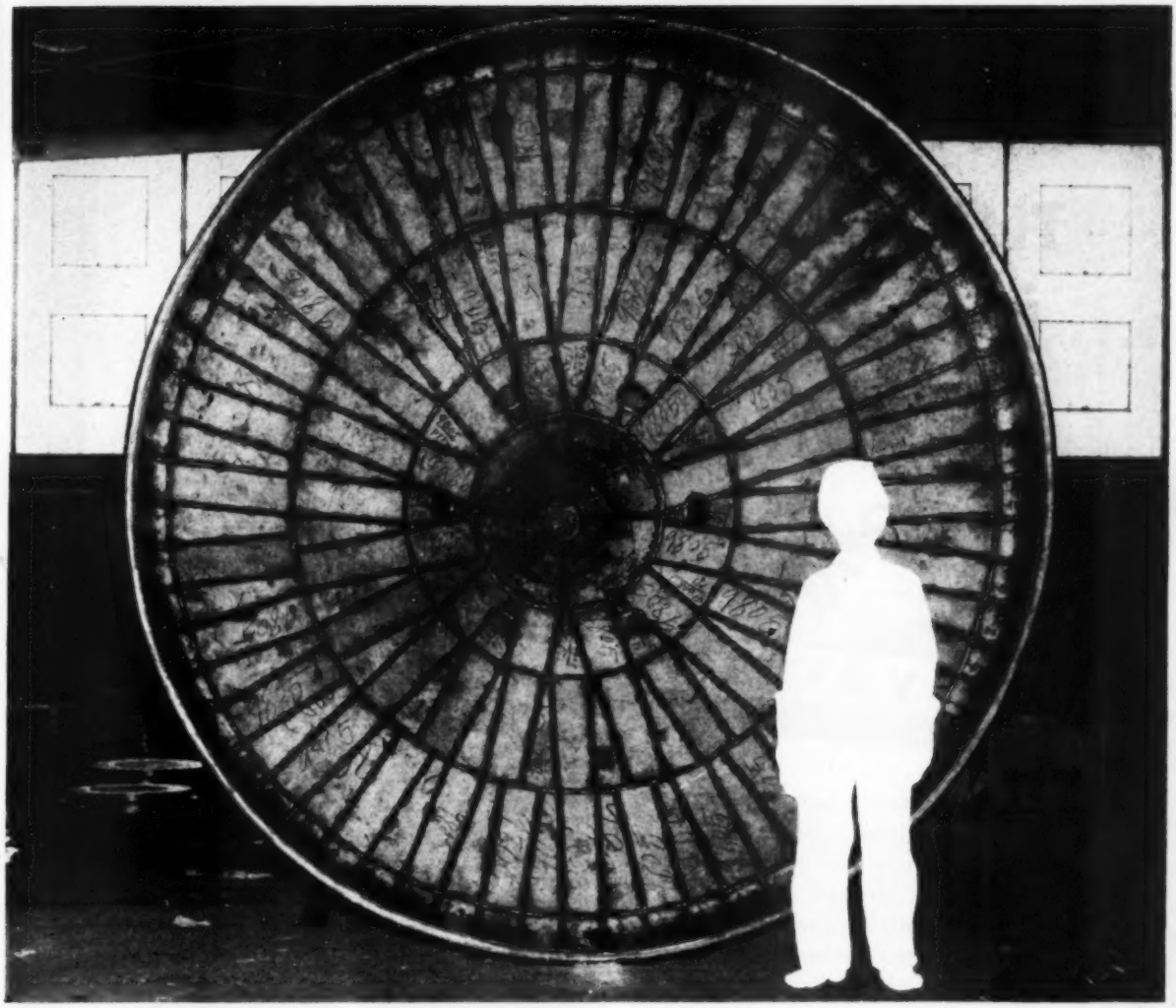
for DEPENDABILITY..

for SERVICE...

for DESIGN AND FINISH...

APPLETON WOOLEN MILLS

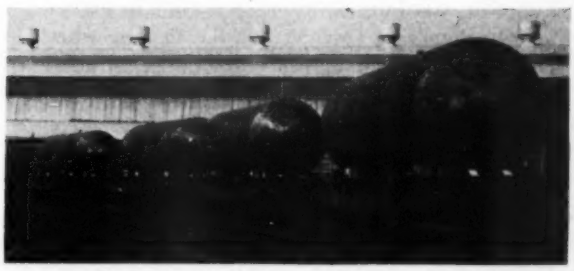
APPLETON, WISCONSIN



There's a welder in this picture...

We've drawn his outline in this picture just so you'd get the idea. But what we really mean to call attention to is his handiwork. The special anti-corrosive lining in the digester bottom shown here is the product of the welder's torch.

Supplying the pulp and paper industry with "custom-made" digesters and steel tanks with these acid-resistant linings is a regular function of our shops. We're equipped to do x-raying and stress relieving too. Cylindrical and spherical pressure vessels, flat-bottom storage tanks, Marx Savealls, elevated water tanks—all belong on the list of products used in pulp and paper mills. For more details, or for quotations, write our nearest office.



Four pulp digesters, each 8 ft. in diam. by 31 ft. 8 in., are shown in this view leaving our Birmingham plant on the way to a pulp mill in Louisiana.

CHICAGO BRIDGE & IRON COMPANY

Atlanta, 3.....2143 Healey Building
Birmingham, 1.....1511 North 50th Street
Boston, 10.....1026—201 Devonshire Street
Chicago, 4.....2445 McCormick Building
Cleveland, 15.....2267 Guildhall Building
Detroit, 26.....1566 Lafayette Building
Havana.....402 Abreu Building
Houston, 2.....2143 National Standard Building
Los Angeles, 17.....1559 General Petroleum Building
New York, 6.....3350—165 Broadway Building
Philadelphia, 3.....1653—1700 Walnut Street Building
Salt Lake City, 4.....527 West 17th South Street
San Francisco, 4.....1547—200 Bush Street
Seattle, 1.....1327 Henry Building
Tulsa, 3.....1651 Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA. In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.

THEIR JOB is to help you get..

Mr. Claude Waltz, operating a Bullard high-speed boring mill here, started at OIC in 1896, at age 19, as an apprentice machinist.

This new, modern Southwark-Emery physical test machine, in daily use, is one of the many mechanical aids added to the 40 years of precision engineering experience of Messrs. Malaney, Doster and Turner.

Mr. A. A. Kruse, factory trained in precision application of valves, is one of many O. I. C. representatives in various parts of the nation qualified and available to aid both distributors and users in valve application.

Precision Engineering of valve designs, Precision Manufacturing and Precision Application—OIC considers all three factors equally essential to good valving. OIC has the years of experience and the service organization to give you all three.

We point with pride to these veteran members of the OIC organization as evidence: Mr. Claude Waltz has been contributing precision machining for 54 years. Mr. D. B. Malaney, Metallurgist, Mr. H. G. Doster, Vice President in Charge of Engineering, and Mr. J. B. Turner, Product Engineer, combine 40 years of service in precision engineering. Mr. A. A. Kruse, Jr., who began in our Engineering Department, is now one of the many field engineers advising users on precision valve application in various parts of this country.

If you're needing valve *application know-how,* call the nearby OIC distributor for the help of a factory representative, or write direct to us. The Ohio Injector Company, Wadsworth, Ohio.

OIC
FOUNDED 1881

VALVES

FORGED AND CAST STEEL · IRON · BRONZE

DON'T OVERLOOK

BROWN SPECIALIZED INSTRUMENTATION IS KEEPING PACE WITH PAPER INDUSTRY MANUFACTURING TECHNIQUES!

THIS SOLUTION TO ALL YOUR TEMPERATURE CONTROL PROBLEMS

...THE *ElectroniK* CONTROLLER

HERE is the truly versatile instrument that has kept pace with your need for automatic temperature control . . . whether in Digesters, Sulphur Burners, Evaporators, Lime Kilns or Dryers.

In seeking improved techniques, the goal has been automatic measurement and control of *all* phases of paper manufacture and conversion. From chip board to bond paper the *ElectroniK* Potentiometer is hitting its stride. Its unmatched sensitivity, rapid response and extreme accuracy makes possible the application of laboratory developments to practical production problems.

A wide variety of sensing elements can be put to work with the *ElectroniK* Controller, giving it remarkable utility in the Pulp and Paper Industry. It may be used with thermocouples, resistance bulbs and radiation pyrometers.

For a full discussion of your control needs—both present and future—call in your local Honeywell engineer . . . he is as near as your phone. Write today for a copy of Bulletin 2801 "Control Instruments for the Paper Industry." MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4489 Wayne Avenue, Philadelphia 44, Pa. Offices in more than 80 principal cities of the United States, Canada and throughout the world.

MINNEAPOLIS **Honeywell**
BROWN INSTRUMENTS

FOR THE PAPER INDUSTRY

HEAT RESISTANCE + ABSORBENCY

S/AA

Asbestos for heat resistance; cotton for absorbency—Hooperwood now combines them both in a new dryer felt that will give you longer service, lower dryer felt cost.

Top surface warps of high tensile heat-resisting asbestos yarn weave directly through the felt, offering natural channels for drainage. A layer of absorbent cotton warps underlays the asbestos to give uniform drying, free from cockle.

Hooperwood S/AA Dryer Felts are completely stabilized as to stretch and shrinkage. The original seam, whether sewed, riveted, or glued, will last the life of the felt.

S/AA is a typical example of how Hooperwood Dryer Felt Engineering works to meet your dryer felt needs. Write today for a sample of S/AA.

WM. E. HOOPER & SONS CO.

General Sales Offices:

New York PHILADELPHIA Chicago

320 Broadway Juniper & Cherry Sts. 300 W. Adams St.

Hooperwood Mills: Woodberry, Baltimore, Md.

HOOPERWOOD DRYER FELTS

You Can't Have Good Paper

Without Good Chemicals . . .

ALUMINUM SULFATE

Standard: Lump; Ground, 99% thru 8 mesh, 95% thru 10 mesh; Powdered, 95% thru 100 mesh.

Iron Free: Lump, approx. 2½", Ground thru 8 mesh. Liquid, 32° Be.

SODIUM SULFATE

(Salt Cake) . . . Paper Makers' Grade, thru 8 mesh, 95-99% Na_2SO_4.

Chemicals are vital in the manufacture of paper. You can't have good paper without them. That is why particular paper makers, when ordering alum, salt cake and other process chemicals, make sure of quality and *specify "General Chemical."*

Other General Chemical Products For the Paper Industry

- Aqua Ammonia
- Chromium Potassium Sulfate (Potash Chrome Alum)
- Disodium Phosphate (Anhydrous)
- Glauber's Salt (Crystal and Anhydrous)
- Hydrochloric Acid (Muriatic)
- Nitric Acid
- Sodium Bisulfite (Anhydrous)
- Sodium Fluoride
- Sodium Hyposulfite
- Sodium Metasilicate
- Sodium Silicate
- Sodium Sulfide
- Sodium Sulfite (Anhydrous)
- Sodium Thiosulfate
- Sulfuric Acid
- Tetrasodium Pyrophosphate (Anhydrous)
- Trisodium Phosphate

SPECIFY "GENERAL CHEMICAL"

51 YEARS OF SERVICE

BASIC CHEMICALS

FOR AMERICAN INDUSTRY

GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

40 Rector Street, New York 6, N. Y.

Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo • Charlotte Chicago • Cleveland • Denver • Detroit • Houston • Jacksonville • Los Angeles • Minneapolis New York • Philadelphia • Pittsburgh • Providence • San Francisco • Seattle • St. Louis Yakima (Wash.)

In Wisconsin: General Chemical Company, Inc., Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

DEMPSTER DUMPSTER SYSTEM

SERVING COST-MINDED MANAGEMENT FROM COAST TO COAST

. . . handling bulk materials of every description at phenomenal savings

Photos show the three simple stages of servicing a container. The Dempster-Dumpster, operated from hydraulic controls by driver in the cab, picks up each container and hauls it to point of disposition where it may be dumped or set down intact.

ALCOA ALUMINUM

—recognized across the nation

. . . Aluminum Company of America, well known for sound management, uses the Dempster-Dumpster System

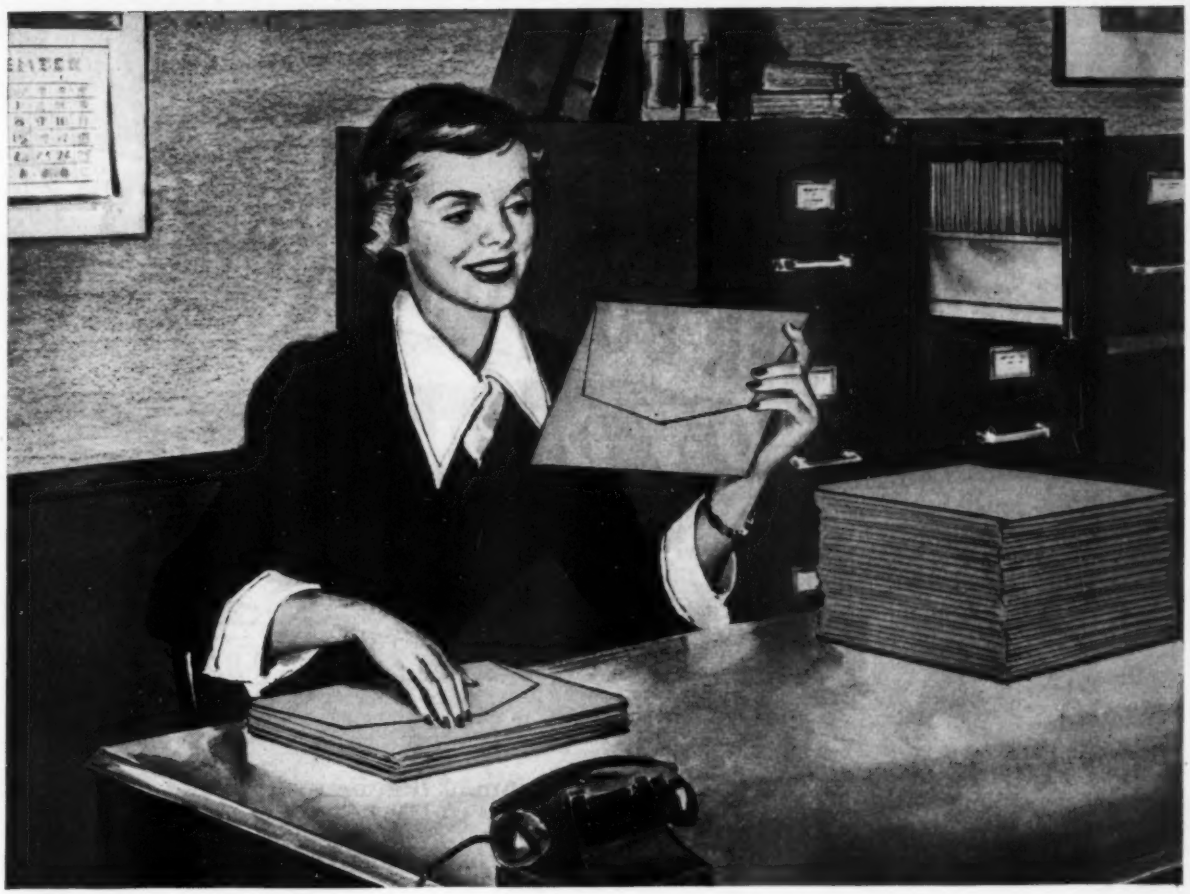
Aluminum Company of America is among the hundreds of cost minded manufacturers, both large and small, using the Dempster-Dumpster System of bulk materials handling . . . the system recognized across the nation for its efficiency and ability to reduce costs.

In the Dempster-Dumpster System one truck-mounted Dempster-Dumpster eliminates up to 10 conventional trucks because one Dempster-Dumpster services a great number of Dempster-Dumpster containers. These detachable containers, ranging in size up to 12 cu. yds., carry pay-loads equal to and greater than conventional truck bodies. They are built in a wide variety of designs best suited to handle any type of materials, be they bulky, light or heavy . . . solids or liquids . . . trash or rubbish. Containers are spotted at necessary materials accumulation points inside and outside buildings. The Dempster-Dumpster services one pre-loaded container after another.

In addition to saving thousands of dollars annually in tires, gas, oil, and truck maintenance, the Dempster-Dumpster System eliminates standing idle time by truck and crews . . . eliminates handling and re-handling of materials . . . and increases efficiency and cleanliness. It will pay you to investigate the Dempster-Dumpster System now! A product of Dempster Brothers, Inc.

One Dempster-Dumpster Services All Containers. . . All Designs. . . All Sizes

DEMPSTER BROTHERS, 790 Dempster Building, Knoxville 17, Tennessee



MORE EYE APPEAL

. . . in colorful kraft envelopes

There *is* an important difference in kraft envelopes . . . and that difference is color. Some are drab, lifeless, washed-out. Others have a sprightly, pert yellow-tan tone that gives them eye appeal . . . and sales appeal.

Some excellent, economical dyes, suitable for kraft papers, are listed here. Others are available. Our Technical Staff will be glad to help you with this . . . or *any* of your color problems. Write: E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Div., Wilmington 98, Del.

FOR MAXIMUM ECONOMY

Du Pont Basic Dyes
- Du Pont Auramine Conc.
- Du Pont Chrysoidine GN

FOR GOOD LIGHT FASTNESS

Du Pont direct dyes
- Du Pont Brilliant Paper Yellow Extra Conc. 125%
- Pontamine* Yellow SXP Conc.
- Pontamine* Yellow S3G
- Du Pont Stilbene Yellow G Conc.
- Du Pont Stilbene Yellow GCB Conc.
- Pontamine* Yellow CH Conc.

*Reg. U. S. Pat. Off.

More color makes more business . . . for your customers and you

Du Pont Dyestuffs

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

20 CYLINDER BOARD MACHINES NOW DELIVER A BETTER SHEET

It's no secret among the men who make paperboard that Downingtown's scientifically engineered Approach Flow Vat System is the one *sure* way to get a quality sheet that has uniform weight and caliper across the machine. After more than a hundred vat installations and experience over a large range of furnishes, we have the answer to your problem, and the men who are using the System know we have . . . Everything possible has been done to insure even dispersion of the fibres right up to the mould, and to reduce entrained air to a minimum.

To get your machine off to a better start toward high production and high quality—plus, let us tell you more.

DOWNINGTOWN
Approach Flow Vat System

DOWNINGTOWN MANUFACTURING COMPANY

DOWNINGTOWN, PA.

Pacific Coast Representative: JOHN V. ROSLUND, Pacific Bldg., Portland 4, Ore.

DESIGNERS AND BUILDERS OF PAPER AND BOARD MAKING MACHINERY SINCE 1880

D.A.*

An HONORARY DEGREE Conferred on

MIDWEST WELDING ELBOWS

By Pipe Welders Everywhere

Pipe welders who know Midwest Welding Elbows have conferred upon them an honorary degree unique in piping . . . "D. A." for "dimensional accuracy".

This degree was earned for Midwest Elbows by their unique process of manufacture. In this process, developed by Midwest, the elbow is first made slightly oversize. After welding it is reheated to forging temperature and brought to final size in compression dies. This relieves forming and welding stress . . . assures true circular cross-section, controlled wall thickness and accurate radius, included arc and tangents. The elbows are beveled on special machines which cut both ends simultaneously, holding exact included angle and center-to-end dimensions.

"D. A." is a degree which means a lot to pipe welders. It means that they don't have to waste time lining up inaccurate fittings. It means that they don't have to spend time and weld metal in compensating for bad fit. And it means that they can produce better, cleaner, stronger welds with less trouble.

"D. A." saves money for you when it saves time and trouble for welders. Use Midwest "D. A." Elbows on your next job. Call your Midwest Distributor; there is one conveniently near you.

MIDWEST PIPING & SUPPLY CO., Inc.

MAIN OFFICES: 1450 SO. SECOND ST., ST. LOUIS 4, MO.
Sales Offices: New York 7—30 Church St. • Chicago 3—79 W. Monroe St. • Los Angeles 33—520 Anderson St. Houston 2—1213 Capitol Ave. • Tulsa 3—224 Wright Bldg. • Boston 27—426 First St. • Stocking Distributors in All Principal Cities

* Dimensional Accuracy

MIDWEST WELDING FITTINGS IMPROVE DESIGN AND REDUCE COSTS

GOSH! MAN, IT'S *PERFECT...*

Buyer: This is what we have been hoping for. Perfect finish on both sides. How do you get them that way? Some secret process, I suppose.

Mill Man: No secret about it. The sheet is carried from the wires through the first press on a Hamilton "wet" Felt. Then it goes through the second press on another Hamilton Felt that finishes the front side. From there it passes through a reverse third press on another Hamilton Felt that finishes the back side exactly the same as the front.

Buyer: Doesn't it slow down the machine to use three presses instead of only one?

Mill Man: On the contrary. Three Hamilton Felts remove so much water that very little time is needed at the driers. Machine runs top speed—turns out more tonnage and brings the cost down.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

Miami Woolen Mills

Hamilton *Felts*

Established 1858

h on
ecret

wires
Then
Felt
ough
ishes

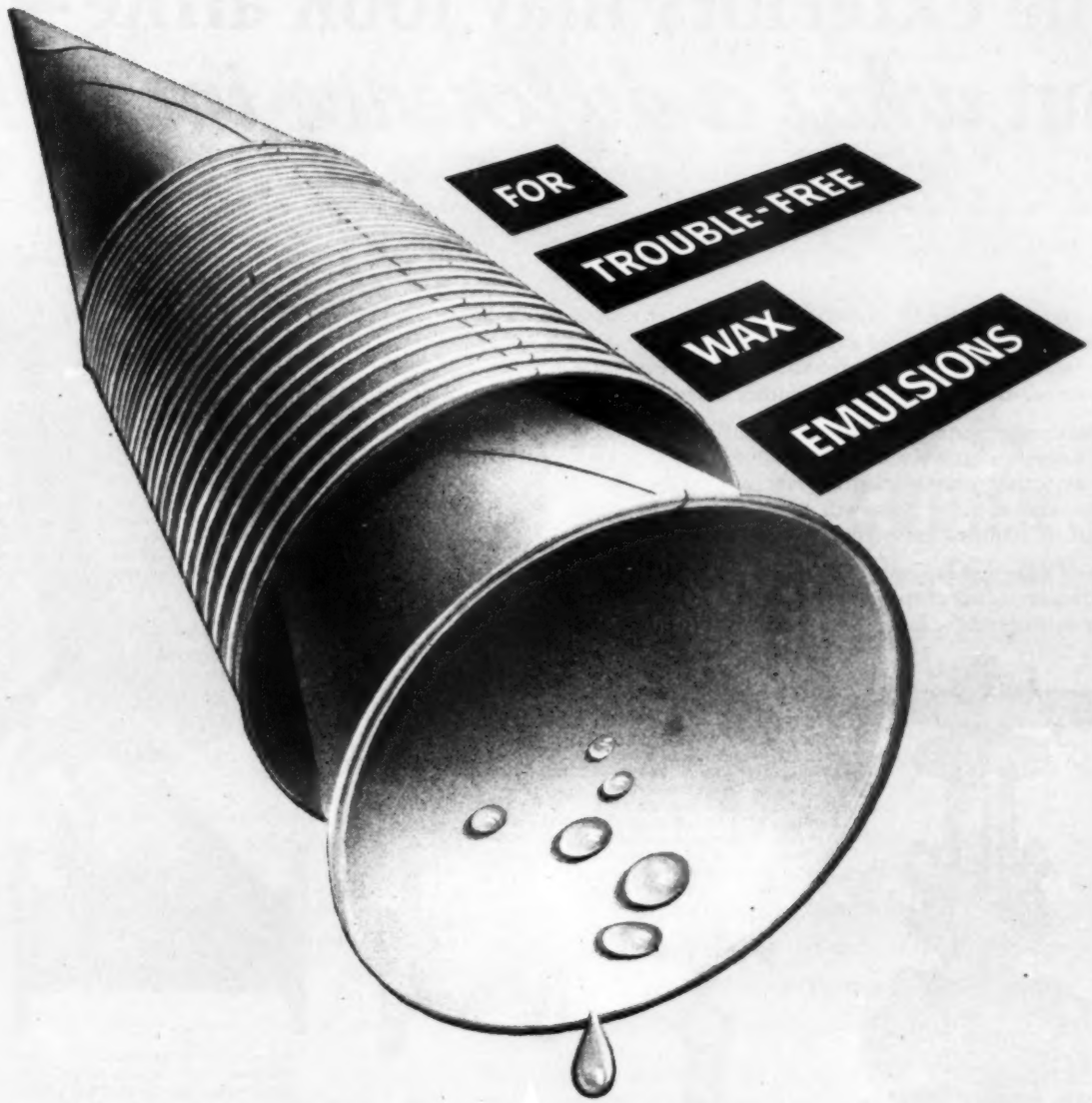
resses

much
chine
s the

O

ed

1950



Satisfactory water shedding for drinking cup or liquid container stock is only one of the many advantages you can gain by using Hercules Paracol®, wax and wax-resin emulsions for paper and board.

A large selection of these versatile emulsions is available and each emulsion is tailor-made to meet specific requirements. They are used to improve sizing, printability, and creasing and bending properties of various grades of paper and board.

Other improved properties gained through the use of "Paracol" are reduced surface friction, reduced curl, and laying of fuzz. A large and experienced Technical Service staff is available to show you how "Paracol" can best work for you. Consult your nearest Hercules sales office.

HERCULES POWDER COMPANY 961 King Street, Wilmington, Delaware

HERCULES PARACOL

WAX AND WAX RESIN EMULSIONS

PPSD-4

The exteriors may look alike— but *what a difference inside!*

Inside one home, life goes on smoothly and harmoniously. But in the house next door there's constant friction and nerve-wearing turmoil.

Compare the outside appearance of any standard Powell valve with that of any other valve of the same type and size. You will probably notice very little difference. But inside—that's another story.

There design, materials and manufacturing skills make the difference between a Powell Valve—built to operate smoothly and efficiently over a long period of time—and a valve that will have only a short life before it requires maintenance or even replacement.

Powell also makes many *exclusive* patterns to meet the requirements of special services. In these, too, long trouble-free performance is a primary consideration.

Fig. 559—125-pound Iron Body Bronze Mounted Swing Check Valve with flanged ends, bolted flanged cap and regrindable, renewable bronze seat and disc.

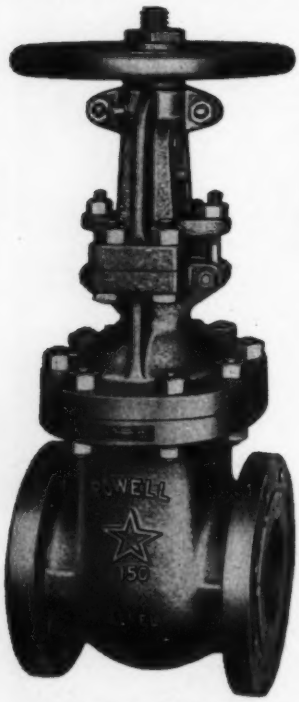


Fig. 1503—Class 150-pound Cast Steel Gate Valve with flanged ends, outside screw rising stem, bolted flanged yoke, tapered solid wedge.

Flanged End O. S. & Y. Gate Valve. 150 pounds W. P. Face-to-face dimension conforms to MSS SP42. Figs. 2471 (Solid Wedge) and **2486** (Double Wedge) available in 18-8S, 18-8S Mo, Durimet "20." **Figs. 2473** (Solid Wedge) and **2488** (Double Wedge) available in Nickel, Monel Metal, Ampco Alloys, Everdur Hastelloy Alloys A-B-C-D. Also made with Screwed Ends.

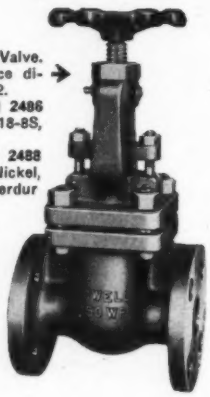


Fig. 2608—Bronze Globe Throttling Valve with full flow through the seat when wide open. Special bronze stem and stainless steel seat and disc hardened to approximately 500 Brinell.

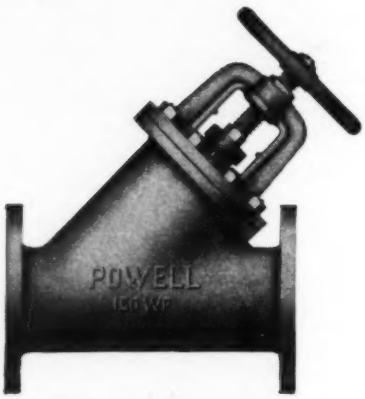


Fig. 1944 — Large 150-pound Stainless Steel "Y" Valve with flanged ends, bolted flanged yoke-bonnet and outside screw rising stem.

The Complete Powell Line includes Globe, Angle, "Y", Gate, Check, Non-return, Relief and Flush Bottom Tank Valves in Bronze, Iron, Steel and a wide range of Corrosion-resistant metals and alloys.

Ask your nearest Distributor—or write direct

The WM. POWELL Co., 2525 Spring Grove Ave.
P. O. Box 106, Station B, Cincinnati 22, Ohio
DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

Now YOU CAN

MAKE BARK B.t.u.'s SHOW A PROFIT!

The Squier Bark Crusher illustrated above is in operation at the Baie Comeau plant of the Quebec North Shore Pulp and Paper Co.

by using the new SQUIER HIGH PRESSURE BARK CRUSHER

HERE are some outstanding features of the new Squier Bark Crusher:

1 Extremely rugged design, based on many years of fibre-crushing experience.

2 No hog required, before or after—handles unhogged bark from barking drums.

3 Special Squier-designed feeding device controlled by air pistons readily handles slippery barks.

4 High nip pressures produce drier bark with consequent higher calorific value.

5 Low moisture content of light, fluffy, splayed-out crushed bark particles permits conveying by fan.

6 Disintegration of bark fibres produces a fuel which will burn readily with any type of furnace feeding.

The new Squier Bark Crusher is a heavy-duty machine providing high extraction of moisture and minimum handling of dry-milled bark residue. Milled bark is crushed with fibres well splayed out, for quick drying or burning directly in furnace.

The Squier Bark Crusher operates *dependably*, with least-possible maintenance cost and low relative horsepower requirements.

Write us TODAY for full details.

The SQUIER Corp.

The Geo. L. Squier Mfg. Corp.

213 MORTIMER STREET **BUFFALO, N. Y.**

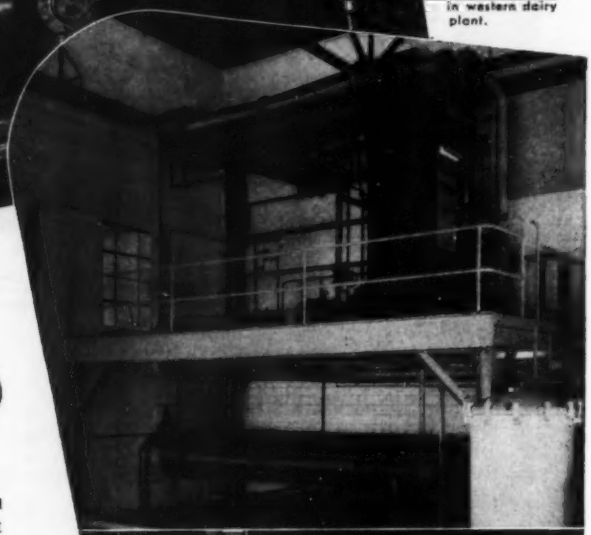
SQUIER

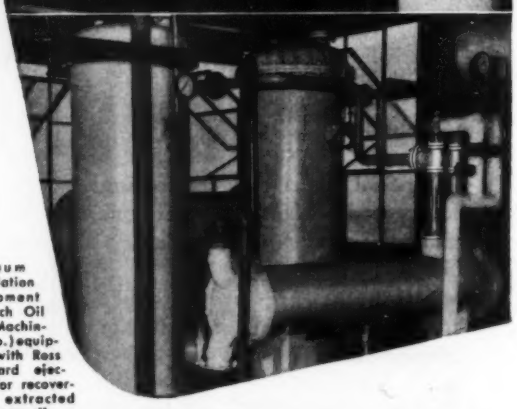
Special or normal . . .

YOUR CONDITIONS ARE STANDARD HERE

Test Rack, equipped with Ross standard ejectors, for a wide range of operating conditions.

Two Ross Decalorators (vacuum refrigerating units) in western dairy plant.





Vacuum distillation equipment (French Oil Mill Machinery Co.) equipped with Ross standard ejectors, for recovering extracted soy bean oil.

ROSS

STEAM JET EJECTORS

Your conditions may be classed "special", or you may consider them "normal". But to Ross, most conditions are *standard*, are quickly met by long, diversified engineering experience . . . highly developed plant skills.

For during the many years that Ross has been designing and fabricating steam jet ejectors . . . starting with their use on surface condensers and following with the more general, industrial applications on vacuum refrigeration, vacuum distillation and oil deodorizing equipment, Ross engineers have gained the position *and the reputation* of dealing with *any* problem quickly, practicably, economically.

As a result of such experience, Ross has been able to standardize ejectors . . . to establish a series of standard frame sizes. Therefore, by simply selecting the most suitable size steam nozzle and other parts, normal requirements can be quickly accommodated. And by the same token, so-called "special" conditions are quickly met, too . . . some through modification of standard units . . . others through individualized engineering and fabrication.

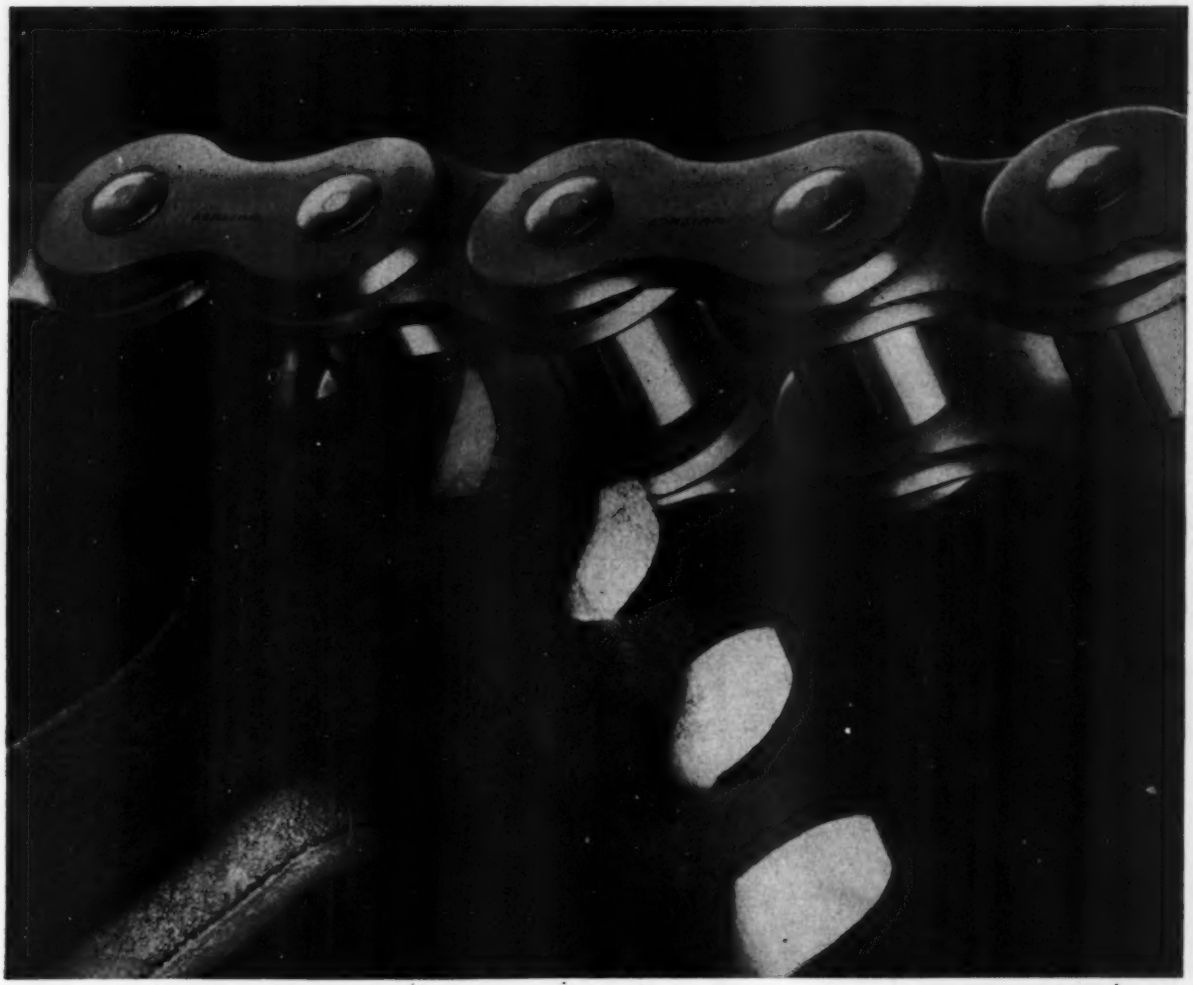
GAIN TIME — Wide experience enables Ross engineers to be of genuine assistance to you . . . whether your conditions call for single or multi-stage units, with or without surface or barometric inter and after condensers. Feel free to consult.

ROSS HEATER & MFG. CO., INC. Division of American Radiator & Standard Sanitary Corporation **1430 West Ave., Buffalo 13, N. Y.**

In Canada, Horton Steel Works, Limited, Fort Erie, Ont.

Serving home and industry

AMERICAN STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON



A Portrait of Drive Efficiency and Savings

Whitney Chain Drives cut transmission costs, provide positive grip, assure product uniformity

Here's a close-up view of a Whitney Roller Chain engaging a sprocket tooth. Examine it carefully . . . by looking a little deeper, you can see power transmission efficiency and cost reducing design elements at work. Note the finely finished alloy steel rollers settling down to a positive, yet smooth engagement with the sprocket teeth . . . that's the all-steel combination, supplying the answer to countless drive problems.

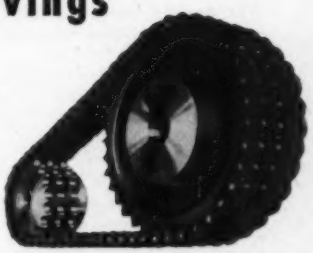
Here are some of the reasons why:

Positive Grip — Deeply seated in the sprocket teeth, Whitney Roller Chains transmit full rated horsepower without friction or slippage. This means constant machine output is maintained . . . highest transmission efficiency is always obtained.

Versatility and Adaptability — Because these roller chains operate on long or short centers, drive shafts clockwise or counterclockwise — separately or simultaneously, they simplify design problems, cut costs of complex drive mechanisms.

Quality — The acceptance of "Whitney" as a quality standard by designers of modern machines is the result of decades of chain making. Alloy steel parts are durably made — precisely assembled to stand up under the severest of operating conditions.

Whitney products are readily available through a nation-wide network of Whitney Distributors and Warehouses. Call the one nearest you for prompt service. For engineering assistance and catalogs write:



OTHER WHITNEY PRODUCTS

- Silent Chains — for smooth, high speed power transmission
- Conveyor Chains — for modern material handling
- Flexible Couplings — for positive but flexible direct drives
- Cut Tooth Sprockets — for smooth engagement, long life
- Whitney Woodruff Type Keys — for greater strength, easy assembly

WHITNEY CHAIN COMPANY

236 Hamilton Street, Hartford 2, Conn.

TEAR OUT

PASTE ON LETTERHEAD AND MAIL TODAY!

Paisley Products, Inc.
1770 Canalport Ave., Chicago 16, Ill.

Gentlemen: We are interested in Paisley SCIENTIFIC Adhesives. Please send me at once, without cost or obligation, the Laboratory Reports and Data Sheet indicated below:

SET-UP BOXES

- ☐ Flatack Non-Warp Glue
- ☐ #3354 Cake Form Non-Warp Glue
- ☐ #6590 Non-Tarnish Non-Warp Glue (Silverware Boxes)
- ☐ #114 Stripping Glue
- ☐ #1707 Combining Cement

FOLDING BOXES

- ☐ #7692 Folding Box Glue
- ☐ #1023 Fast Set Glue
- ☐ #2007 Water Resistant Cement
- ☐ #2010 Wax Carton Glue
- ☐ #4199 Brightwood Resin Glue (for Waxed Stock)
- ☐ #3740 MST Cellophane Windows
- ☐ #3440 Acetate Window Adhesive
- ☐ #7528 Cartonlite Glue
- ☐ Paisley Liquid Spray for Offset Prevention

PAPER CONVERTERS' ITEMS

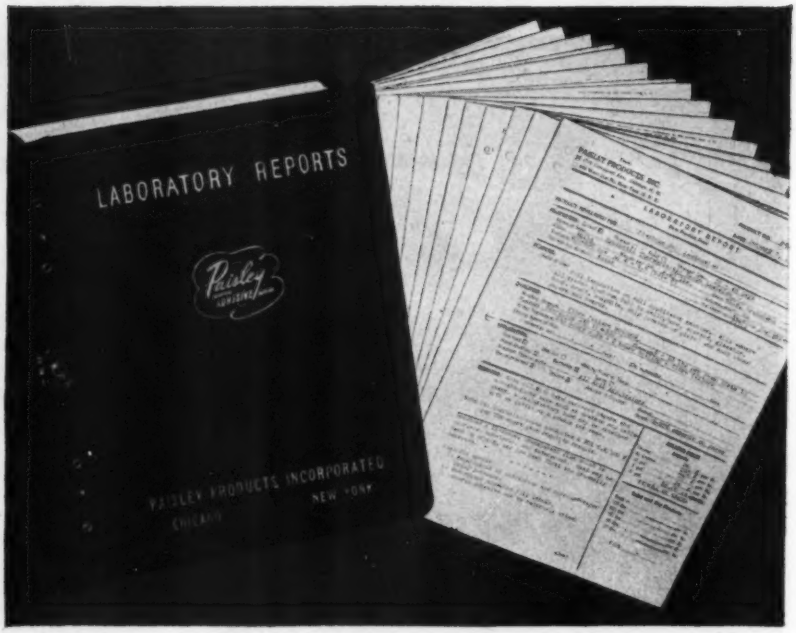
- ☐ #773 Water and Grease Resistant Tube Glue
- ☐ #951 for Splicing Paper Rolls
- ☐ #1704 for General Industrial Combining
- ☐ #1706—for General Industrial Combining
- ☐ #2012 Waxed, Acetate and Foil Laminated Stocks
- ☐ #3122 Pyroxylin Coated Cloth and Paper
- ☐ #3199 Asphalt Coated Papers
- ☐ #3267 Water Resistant Paper Work
- ☐ #3408 Coated Paper and Pliofilm
- ☐ #3420 Waxed-Glassine Papers
- ☐ #3424 Waxed-Glassine Papers
- ☐ #3740 M.P. Cellophane Windows
- ☐ #3908 Bag Seams
- ☐ #4030 Gluing Off in Book Binding
- ☐ #4367 Water Resistant Tube Glue
- ☐ #6310 Aluminum Foil Lamination
- ☐ #6323 Pliofilm Adhesive
- ☐ #7058 All Purpose Cement
- ☐ #7508 Spot Label Gum
- ☐ ADHESIVE OPERATION DATA SHEET (You fill in and return for Laboratory Recommendation)

FIRM_____

STREET_____

CITY_____ STATE_____

BUYER_____



FOR THOSE *HARD-TO-GLUE* JOBS..

Paisley SCIENTIFIC Adhesives
Glues . . Pastes . . Resin Emulsions

THERE isn't a single adhesive operation in your plant that can't be done quicker, more efficiently, and perhaps at lower cost, with a Paisley *Scientific* Adhesive! Regardless of the *type* of materials to be bonded, the *method* of application, or the setting speed required, Paisley can supply the ONE *best* Adhesive for the job. Get all the facts about Paisley *Scientific* Adhesives. Check the coupon for the free Laboratory Reports in which you are interested. Or, send today for our Adhesive Operation Data Sheet.

FREE CONSULTING SERVICE

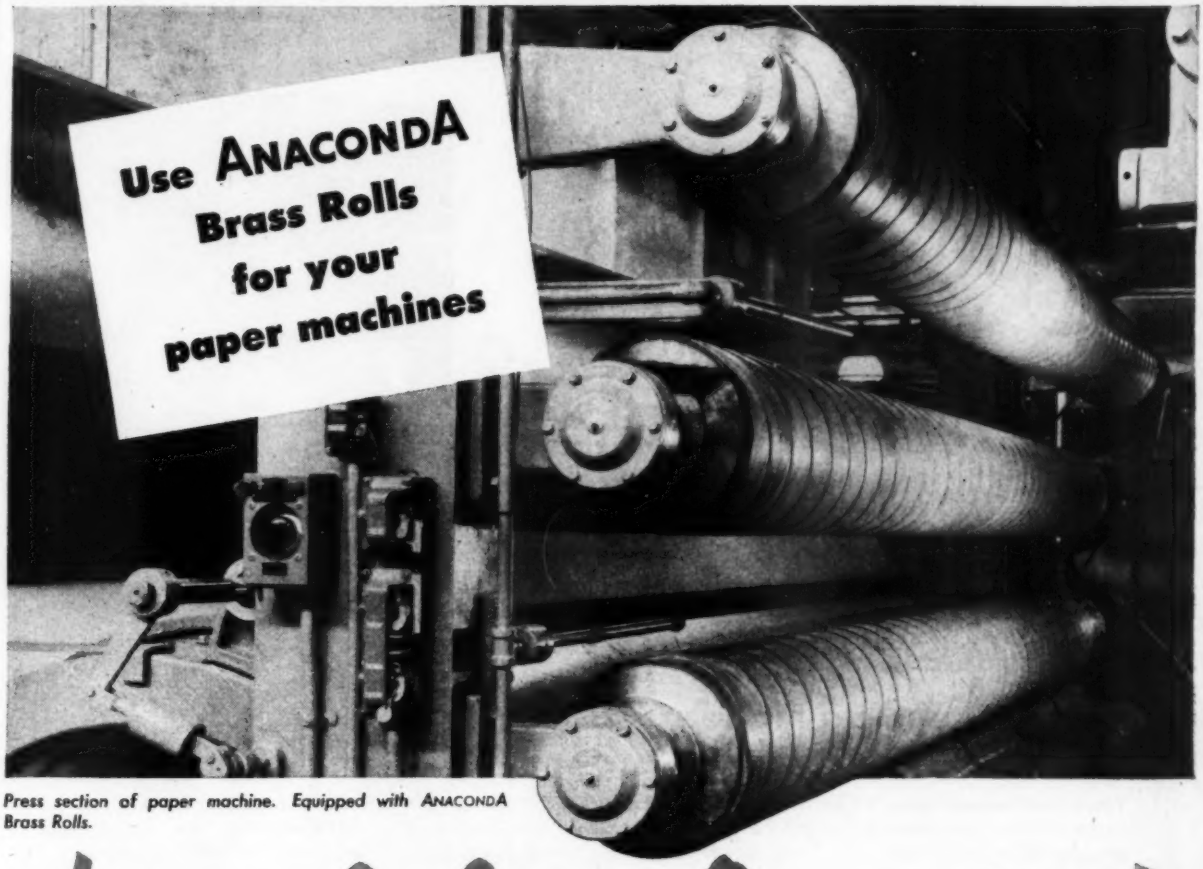
There's a laboratory-developed, tested and controlled PAISLEY scientifically designed Adhesive for every fabricating, manufacturing, product labeling and sealing operation. Buy your Adhesives the scientific way. *Send for an Adhesive Operation Data Sheet. Fill in and return it to our laboratory for analysis and recommendations. Write today. There's NO obligation.*

Paisley SCIENTIFIC ADHESIVE SERVICE

PAISLEY PRODUCTS INCORPORATED

1770 CANALPORT AVENUE, CHICAGO 16, ILL. PHONE CANAL 6-2219
630 WEST 51st STREET, NEW YORK 19, N.Y. PHONE COLUMBUS 5-2860

Manufacturers of Glues · Pastes · Resin Adhesives · Cements and related Chemical Products



Press section of paper machine. Equipped with ANACONDA *Brass Rolls.*

be safe from Corrosion!

BRASS is the economy metal for corrosion resistance —the metal that does the job at lowest cost.

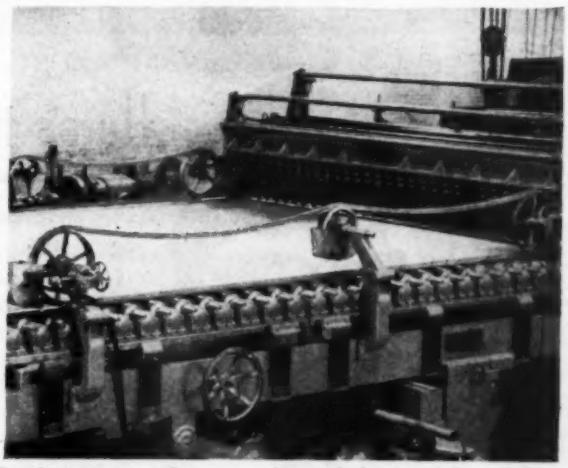
For the resistance of brass to corrosion is inherent. Brass rolls need no protection, no covering against attack by water or chemicals.

You can also count on brass rolls to stay clean—there's no tendency to pick up stock.

For rolls that are right in composition, fabrication, tolerances and finish—specify ANACONDA.

Our Technical Department can bring to your problem both its long familiarity with your special needs and its expert knowledge and skills in copper alloys. This service is yours merely by writing The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

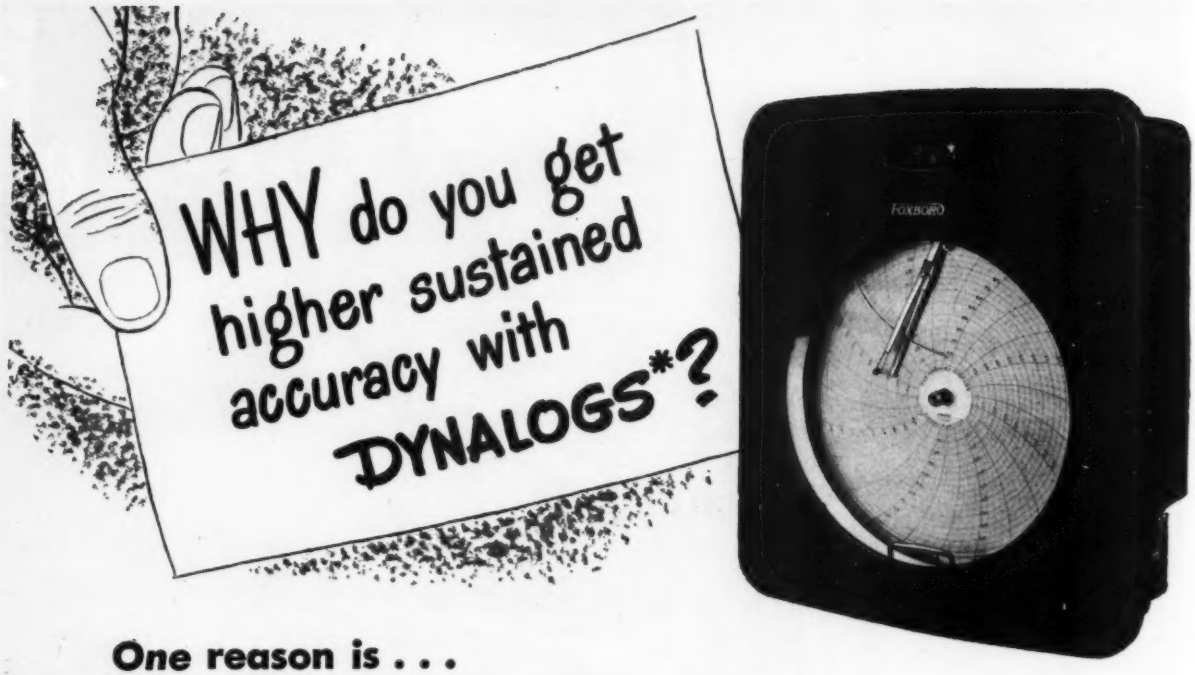
50181



Fourdrinier section of paper machine with ANACONDA *Brass Rolls.*

PHOTOS COURTESY, RICE BARTON CORPORATION

For dependable paper production . . . use ANACONDA® BRASS ROLLS



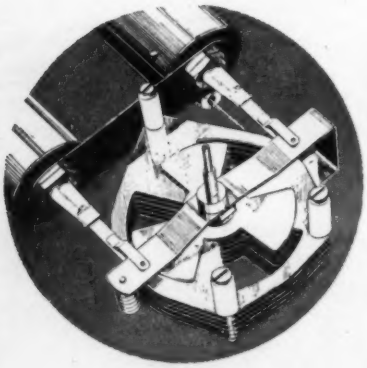
One reason is . . . they need no standardizing!

Your instrument men know that product quality suffers when measurement drifts between manual standardizing adjustments. They know, too, that even automatic standardizing allows accuracy to be lost when batteries discharge without being noticed. And if the process is on automatic control, standardizing of either kind "bumps" the process periodically.

You can eliminate these inaccuracies and inconveniences by putting Foxboro Dynalog Electronic Instruments on the job. They require no standardizing, use no batteries. The balancing system has only six moving parts, none moving faster than the pen. Mechanical complications are eliminated, maintenance reduced to the vanishing point.

No standardizing is only one of many important advantages of Dynalog Instruments. Their unique design brings laboratory-standard performance to the measurement and control of temperature (with resistance bulbs or thermocouples), humidity, pressure, flow, force, pH, conductivity, etc. Their speed . . . full scale to new balance in as little as one second. Sensitivity . . . one ten-thousandth of scale. Accuracy . . . ¼ of 1% of scale.

*Reg. U. S. Pat. Off.



Here's the heart of Dynalog superiority

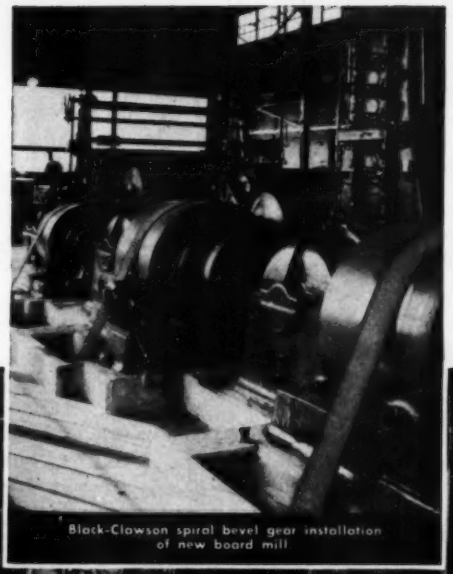
It's the simple variable capacitor that does it. Taking the place of the conventional slidewire, it gives Dynalog Instruments absolutely STEPLESS continuous balancing. It gives you an instrument of laboratory accuracy with a ruggedness that defies the most extreme industrial conditions. Get the complete story in Bulletin 427-1. Write **The Foxboro Company, 158 Neponset Ave., Foxboro, Mass., U. S. A.**

FOXBORO DYNALOG

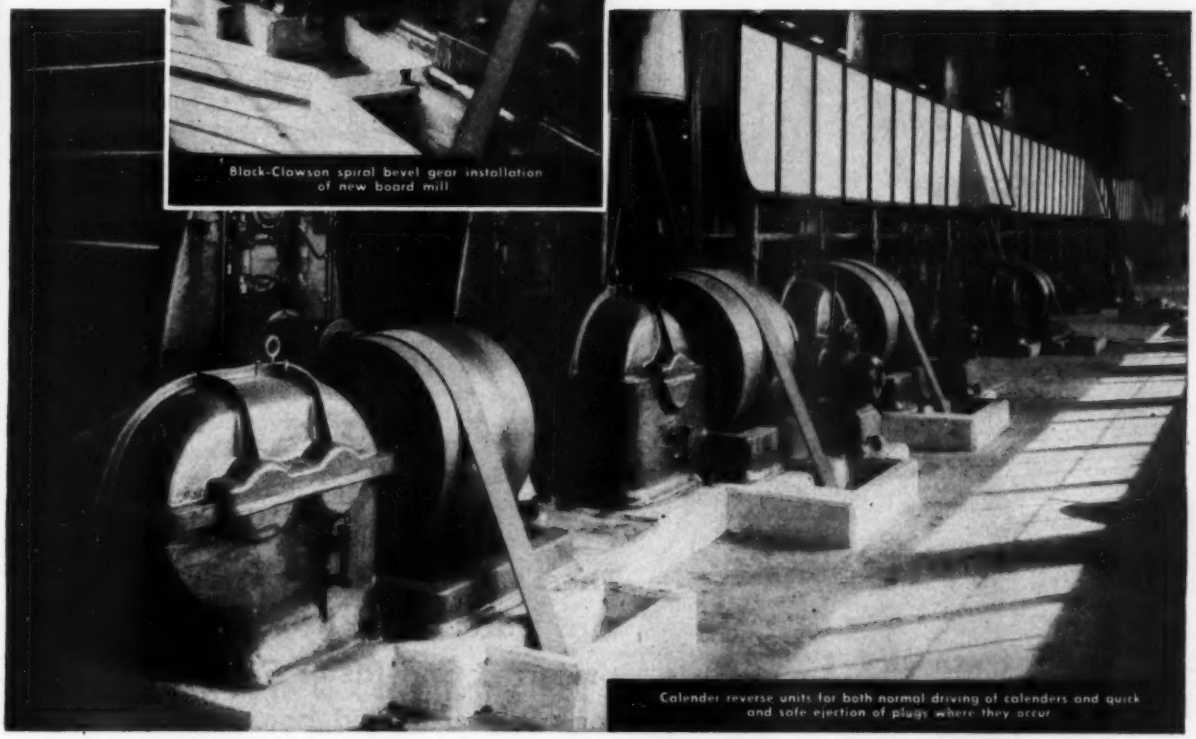
Reg. U.S. Pat. Off.

The electronic potentiometer that has NO SLIDEWIRE

The DRIVE
that really pays off



Black-Clawson spiral bevel gear installation of new board mill



Calender reverse units for both normal driving of calenders and quick and safe ejection of plugs where they occur

Hitch your paper machine to the most dependable make of drives that money can buy and you will avoid many a shut down for repair and many a production loss.

There is no better drive in existence than the Black-Clawson—no more generally used drive—no more dependable drive.

B-C drives are exceptionally rugged. They're quiet. They're virtually vibrationless. They're easy to synchronize to the required variations in speed of the several sections of the machine—particularly new machines.

- **Spiral bevel gear**
- **Extended Shaft (Double Reduction with or without Airflex Clutch operation)**
- **Hypoid gear**
- **Calender reverse**
- **Dryer inching**

THE BLACK-CLAWSON CO., Hamilton, Ohio

DIVISIONS: SHARTLE BROS. MACHINE CO., Middletown, Ohio
DILTS MACHINE WORKS, Fulton, New York
WESTERN SALES OFFICE: Mayer Bldg., Portland, Oregon
ASSOCIATE: ALEXANDER FLECK LIMITED, Ottawa, Canada
SUBSIDIARY: B-C INTERNATIONAL, LTD., 16 Catherine Place, Victoria, London S. W. 1, England

STARCH

There's plenty of proof
that starch is the
preferred and faster **FASTENER**
for all corrugated board.

and...

for a dependable, quick-setting,
better-binding corrugated
board starch...

Use **A-B STARCH**

CORN PRODUCTS DEPARTMENT

ANHEUSER-BUSCH, INC. ST. LOUIS

SEATLESS MEANS ECONOMY

IN BOILER BLOW-DOWN SERVICE

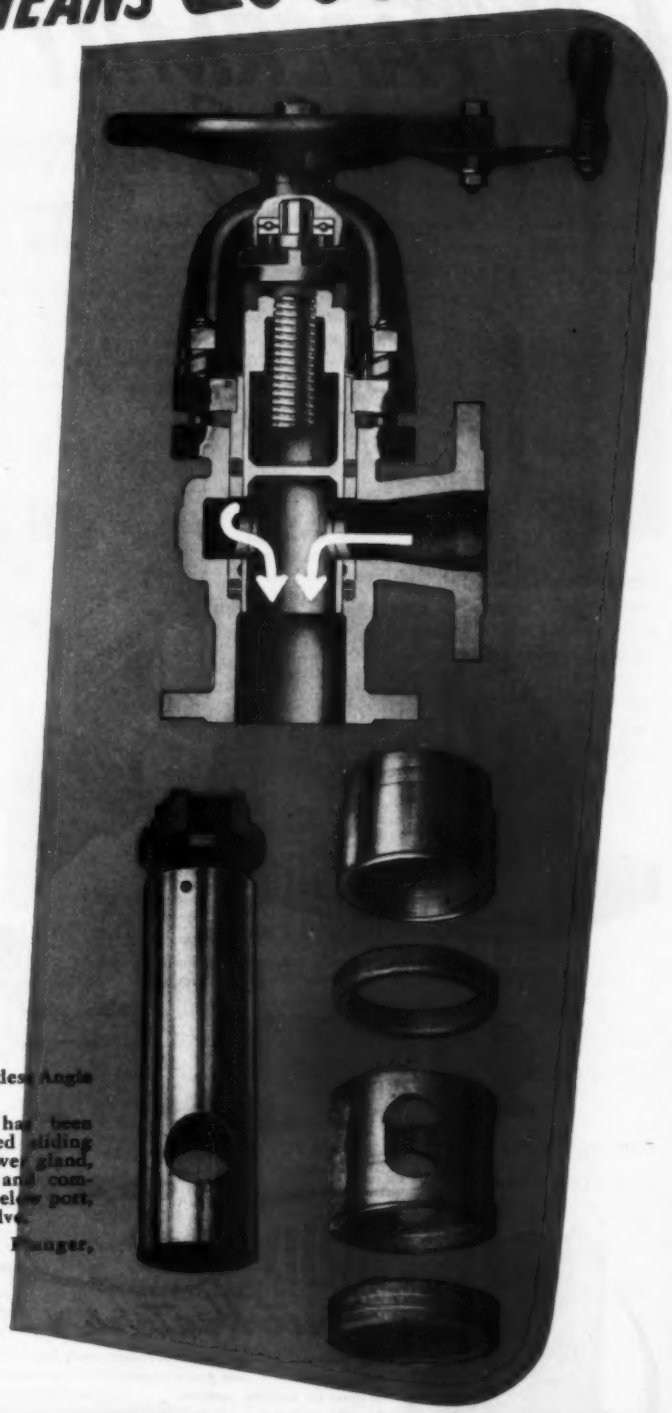
Because they eliminate the commonest source of trouble and expense in ordinary blow-off valve service, Yarway *Seatless* Blow-Off Valves mean real economy to boiler plant operators. *Yarways have no seat to score, wear, clog and leak.* Lubrication is usually the only maintenance they require.

Yarway introduced the seatless principle with the balanced sliding plunger many years ago . . . has constantly improved and adapted it to meet modern service requirements. Mechanical and metallurgical research in Yarway's own Steam Laboratory anticipates changing conditions . . . keeps Yarway valve design ahead.

There is a Yarway Blow-Off Valve for every pressure.

SEND FOR FREE BLOW-OFF VALVE BOOKLET. PLEASE INDICATE THE PRESSURE OF YOUR BOILERS.

YARNALL-WARING COMPANY
149 Mermaid Avenue, Philadelphia 18, Pa.



(*Above*)—Cross section of Seatless Angle Valve, flanged.

OPERATION: After valve has been closed, shoulder on balanced sliding plunger contacts upper follower gland, forcing it down into body and compressing packing above and below port, making an absolutely tight valve.

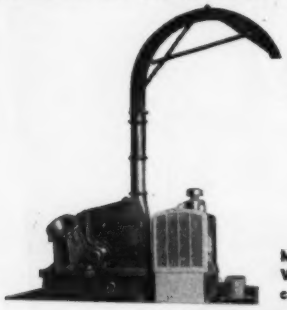
(*Below*)—Balanced Sliding Plunger, Packing Rings and Glands.

YARWAY BLOW-OFF VALVES

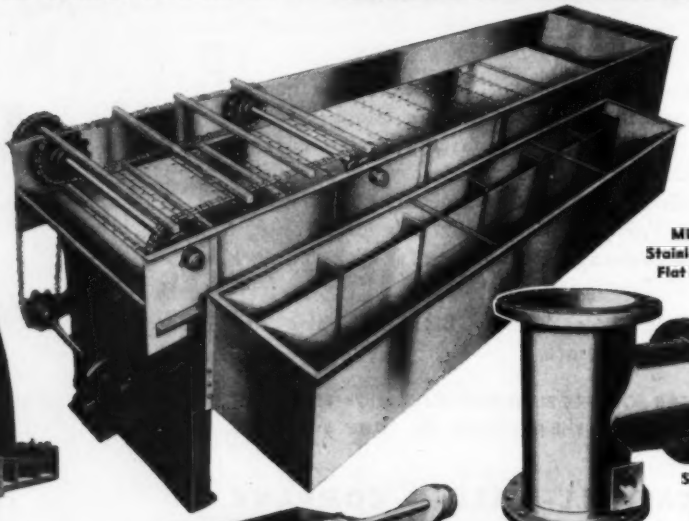
Consult MURRAY for MODERN PAPERMILL and WOODROOM Equipment

To the paper industry we offer a complete service including engineering, pattern making, modern machine shop facilities and foundry operations—all top quality because of our over 65 years' close association with the needs of paper manufacturers. Consult Murray when seeking modern equipment to meet today's need for high quality production at lower cost—no obligation for complete details and engineering recommendations.

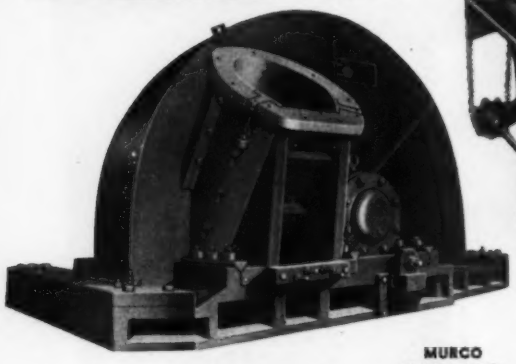
BACKED BY OVER 65 YRS EXPERIENCE



MURCO Portable Wood Chipper—a compact unit.

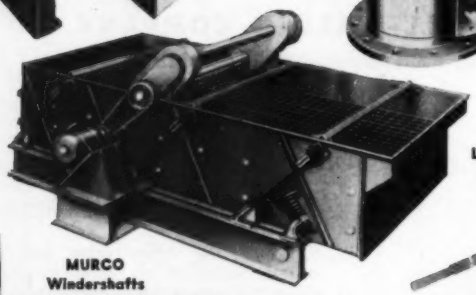


MURCO Stainless Steel Flat Screen

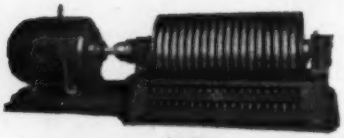


MURCO Multiple Knife Wood Chipper

Stainless Steel Pipes and Fittings



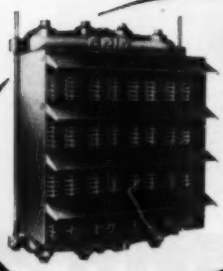
MURCO Level Vibrating Double Deck Chip Screen



MURCO Chip Crusher

MURCO Windershafts

MURCO Quick Opening Gate Valves

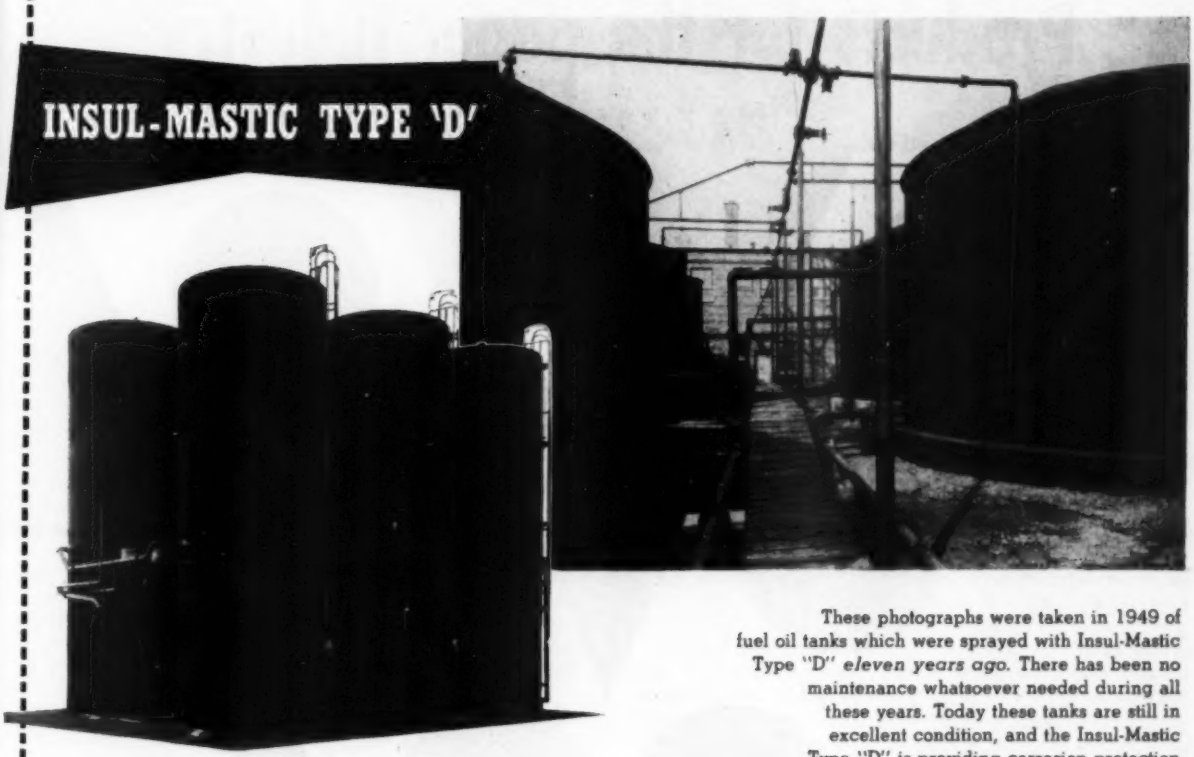


GRID *Unit Heaters & Blast Coils*

For heating, drying and processing equipment, GRID cast iron construction assures trouble-free service . . . one piece construction high test cast iron heating sections . . . no soldered, brazed or welded sections . . . no electrolysis to cause corrosions, breakdowns, leaks or heating failures . . . may be used on steam pressures up to 250 lbs. Send for catalog, engineering data and capacity tables.

D. J. MURRAY MANUFACTURING CO. WAUSAU WISCONSIN

The coating that both insulates and prevents corrosion



These photographs were taken in 1949 of fuel oil tanks which were sprayed with Insul-Mastic Type "D" *eleven years ago.* There has been no maintenance whatsoever needed during all these years. Today these tanks are still in excellent condition, and the Insul-Mastic Type "D" is providing corrosion protection and unimpaired insulating value.

Serves many years without maintenance

INSUL-MASTIC TYPE "D" is the dual purpose coating that not only insulates but also prevents corrosion. It is quickly applied to tanks, ducts, pipes and other metal vessels by spray gun and adheres at any angle without mechanical support.

INSUL-MASTIC TYPE "D" will stop heat flow through metal by 65%, and pays for itself in a short time by fuel saving—such as in the case of oil storage tanks, where heat is used to maintain a free flowing viscosity.

INSUL-MASTIC TYPE "D" also prevents condensation and has proven to be very effective on cold water intake lines in power houses and other places where water absorbent insulations have given trouble.

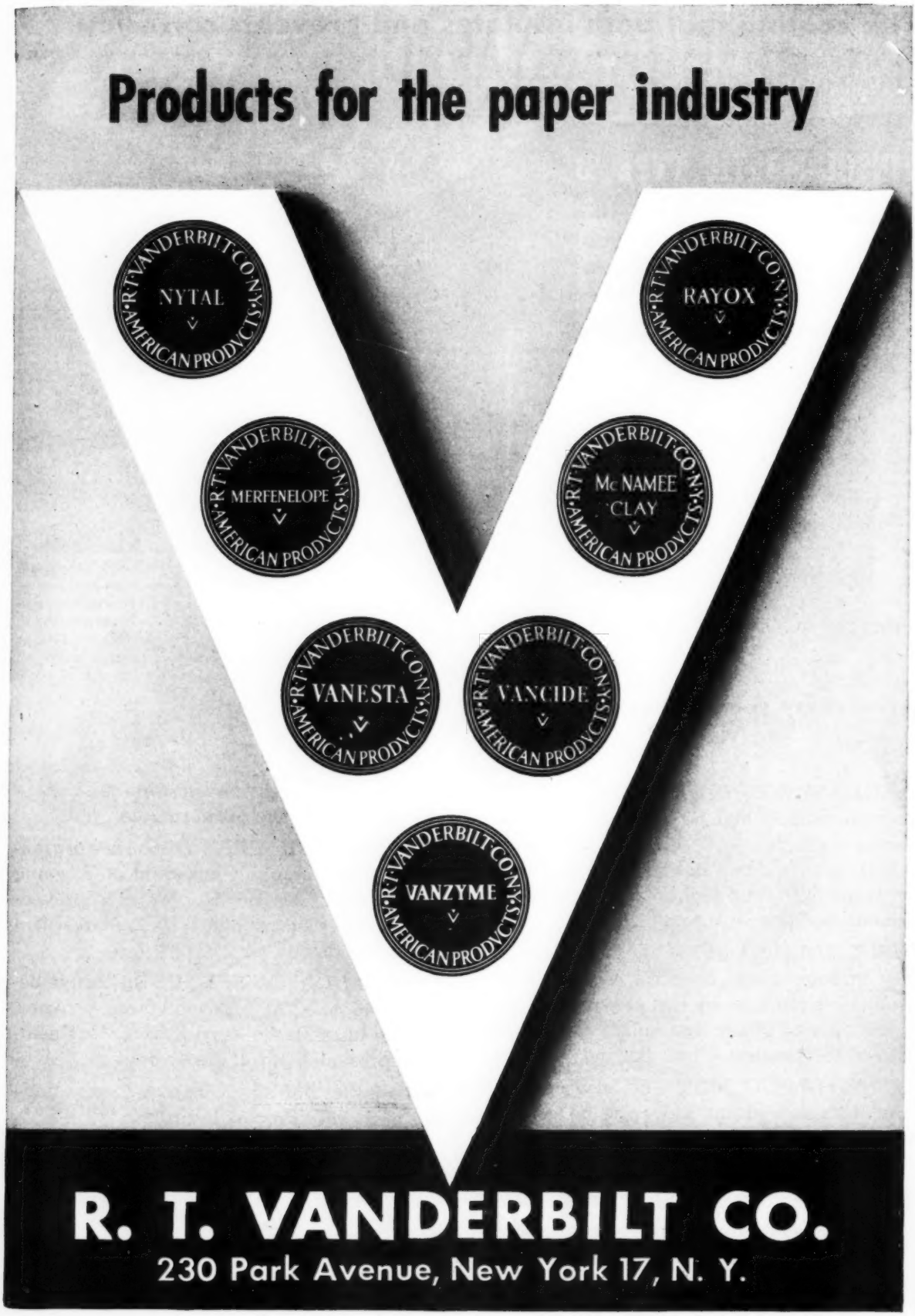
INSUL-MASTIC TYPE "D" consists of granulated cork thoroughly mixed into a Gilsonite base binder, hence its corrosion preventive and adhesive properties. It is also resistant to most acids and alkalis.

INSUL-MASTIC TYPE "D" is effective between -40° to +300° F. Beyond these extremes, use the Insul-Mastic Vinyl System. Our nearest representative will gladly help you.

Write for further information or see our catalog in Sweet's Process Industries.

Insul-Mastic Corporation
OF AMERICA
1157 OLIVER BUILDING · PITTSBURGH 22, PA
Representatives in Principal Cities

Products for the paper industry



R. T. VANDERBILT CO.

230 Park Avenue, New York 17, N. Y.

The Paper Industry

September 1950

New ideas are worth going after

INCREASING INDUSTRIAL ACTIVITY, together with the pressure of defense mobilization, is just beginning to make us more aware of the problems of industry operation in a warlike economy. Because the experiences of the last war are still fresh in mind, it is not hard to visualize demands that might be made on the paper industry from the standpoint of product quality as well as that of shortages of many vital supplies. It seems almost inevitable that we shall be challenged again to produce more and better paper products under an increasing burden of regulation brought about by a mobilized economy. It's going to be necessary to apply every bit of ingenuity and technical ability to keep our mills operating efficiently.

One of the ways these challenges are met is to pool experience so that all mills can take advantage of individual developments. One of the most important ways to do this is to attend and participate in the technical meetings and conferences sponsored by various industry groups.

Looking over the calendar for the next few months we are impressed with the number and variety of society meetings that apply to specific phases of paper technology. Others are of more general interest but all in all, nearly every technologist, supervisor and executive should find something on the list that will meet his particular need. For instance, there are several TAPPI meetings of special groups such as the annual Engineering Conference and the Testing Division Conference. Meetings are being devoted to such subjects as plastics, alkaline pulping and fibrous agricultural residues.

Also on the calendar are the numerous divisional meetings of the Superintendents' Association. Held in the various papermaking regions, these divisional conferences tend to cover subjects of greatest interest to the mills in a particular area. These meetings have grown increasingly valuable in recent years.

Again checking the calendar, we find numerous events that are much broader in scope than our paper industry meetings and which offer a great deal. These include the Instrument Conference and Exhibit sponsored by the Instrument Society of America, the National Safety Congress, the Power Show and the Plant Maintenance Show.

It isn't enough to read reports of these meetings, since many of the newer developments are discussed person to person rather than in the formal atmosphere of the meeting hall. In the days to come we'll need every bit of information that will aid the efficient operation of our mills. Attendance and participation in industry and professional society conferences is one of the surest ways to keep abreast of an advancing technology.

Uninterrupted flow of raw materials is necessary

THE DEFENSE SPENDING PROGRAM resulting from the Korean situation will add (according to present calculations) about 4 per cent to the Gross National Product. This estimate is released by the Office of Industry and Commerce, U. S. Department of Commerce.

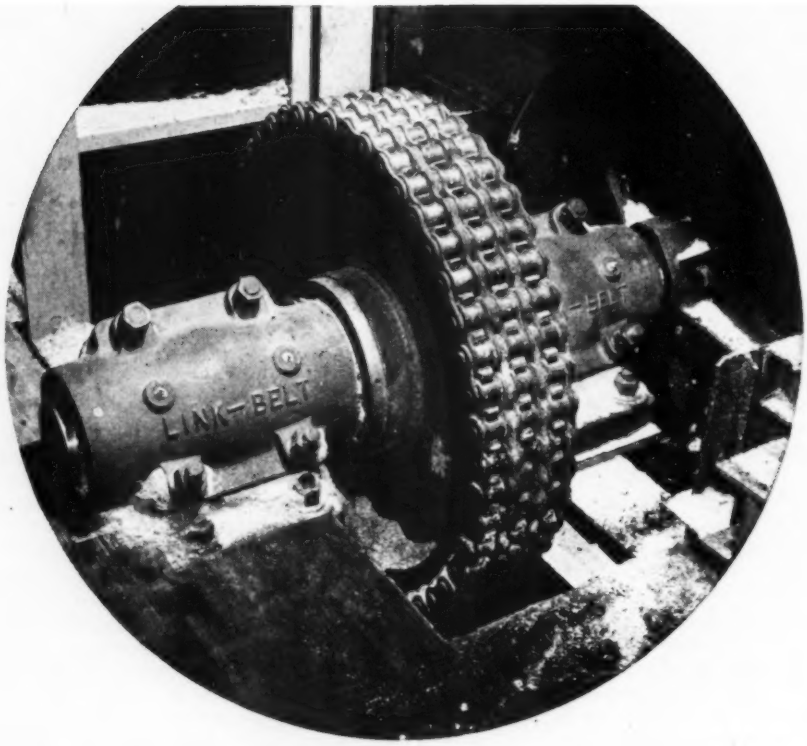
The OIC's August report on the pulp, paper and board industries also states that at the present rates of production, the output of primary paper and board during 1950 will reach an all-time high of more than 23 million tons. This estimate exceeds last year's total production by 15 per cent, and is more than 5 per cent above the previous peak output of 1948.

Confidence is expressed that the U.S. paper and board industry—on an over-all basis—readily can supply the indicated demand for both government and civilian requirements during the remainder of this year *provided supplies of essential raw materials are not severely curtailed.*

Because of these extra demands, the conservation and economy of raw materials must be managed wisely. In certain sections there looms a shortage of wastepaper which has brought into operation an emergency program inaugurated by the Midwest Consumers of Waste Paper. Fortunately, many communities still have a semblance of organizations maintained during World War II for wastepaper conservation. Advertising programs already inform the public of this need. Also there are reports here and there of a straw shortage, and one author in this issue cites a labor shortage in the woods due to military draft of manpower.

Shortage of chemicals vital to the paper mills also is being felt by a midwestern papermaking sector—this due to crippling strikes in some of the eastern chemical plants.

Notwithstanding direct and indirect governmental demands upon the industry, operating mills and new mills being completed are geared to capacity production. That, however, is dependent upon the uninterrupted service of all suppliers. In turn, the suppliers must have the continual support of all contributing factors—which means *no strikes.*



Triple width Link-Belt Precision Steel Roller Chain Drive on headshaft of log haul conveyor at the new Board Mill, Weyerhaeuser Timber Company, Springfield, Oregon.

there's never a slip
with a LINK-BELT GRIP

Positive transmission of power and efficient conveying with compactness, wide flexibility of arrangement and ability to absorb shock are characteristics of roller chain, which are enhanced by the precision manufacturing methods and metallurgical control followed in the huge Link-Belt chain plant.

Link-Belt Precision Steel Roller Chain and Sprockets are available in single or multiple widths, in ⅜" to 3" pitch as well as the double pitch. Also, with various types of attachments. Made to manufacturers' A.S.A. standards.

12,017-D

Typical Link-Belt Precision Steel Roller Chains for Conveying and Power Transmission.

Link-Belt cut-tooth Sprockets, accurately made to fit chain, assure longest chain and sprocket life.

LINK-BELT
PRECISION STEEL
ROLLER CHAINS
AND SPROCKETS

THE SYMBOL OF QUALITY · LB · LINK-BELT

LINK-BELT COMPANY

Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Johannesburg. Offices, Factory Branch Stores and Distributors in Principal Cities.

Paper and the war program

THE KOREAN WAR situation is developing, from an industry standpoint, into a kaleidoscopic picture of vast dimensions. Not even the key figures at Washington seem to know where they are going, or in what direction. Men of equal standing, sometimes even in the same department, differ in their pronouncements of what the future will bring.

One thing is certain — widespread controls are coming, the chief problem being *when*.

For two basic reasons, it can be assumed that complete controls will not be put into effect much before the end of this year. This forecast is qualified by the possibility of earlier action if the localized Korean conflict becomes of world-wide dimensions.

The first reason for delay is that until the pinch of military demands becomes more pronounced, the need for cut-backs will not appear. However, as production of military equipment exhausts immediate inventories of steel and other raw materials such cutbacks can hardly fail to be called for; and the time table depends on the speed with which civilian industry is diverted to military output. A present estimate is that it may be three or four months before a pinch in basic materials becomes felt.

The second reason for delay is the political attitude at Washington. This is not entirely to be blamed on the Administration. Anti-Administration legislators are also responsible to some degree. Neither side wants the issue of price and wage controls to have its impact on the civilian population until after the November Congressional elections. There is little question that "politics as usual" is exerting its influence on the program planners. Once the elections are over, the brakes will be released.

An immediate crisis might well nullify these prospects of delay, but at the moment all plans for the future are in a state of flux.

While Administration forces are floundering in an attempt to meet the Korean situation, Congress is torn between proposals for radical legislation desired by the Administration, and efforts of the opposition to avert an expansion of executive powers. Tax legislation is still in the hopper. Anti-trust legislation is on the calendar, manpower controls and defense production legislation are all before Congress. With both sides protesting their determination to see the Korean war (or a greater conflagration) carried to a successful end, neither is willing to concede that the other is seeking a nonpartisan national defense program. It would be a sad commentary on democracy if Washington fiddles with politics while America burns.

It is true that some bills have been acted upon, relating to taxation, increases in strength of the armed forces, and civilian mobilization, the latter giving the President specified standby powers. At best these measures are of the stop-gap type and are likely to be the subject of further action, dependent upon the Korean developments, and also, say the cynics, after the November elections. The civilian war powers bill as it passed the Senate was not what the President desired, but it leaves to his discretion the decision as to imposition of wage and price controls, and rationing of goods for public consumption.

Paper industry now recognized as essential

While the paper industry has been operating at an unprecedented rate, it is interesting to note that the public attitude toward the industry has been changing rapidly, as seen from Wall Street. There was a time, not so long ago, when investors were chary of investing in paper mill securities. Today, paper mill securities are rapidly growing more popular. Outstanding brokerage houses are now for the first time listing various paper mill securities on their preferred lists of recommended purchases. Recent stock split-ups by large companies have assisted in the popularization of these issues, and an attitude of the public which is willing in increasing numbers to put their savings in these securities is building greater appreciation of the importance of this industry to the national economy. It is not a speculative development, but a belated recognition of the part that paper plays in the country's industrial welfare.

Assuming that there will be an eventual control of some form on all civilian products, the paper industry will have many serious problems, and some already are becoming apparent even though present output and activity are at an all-time high.

That these problems of the future will have a direct bearing on the paper industry cannot be disputed. In World War II, it took many months — really years — before Washington came to realize that the production of paper was an essential industry. That lesson has been well learned, and there will be no such delay in organizing Government paper control in the months to come. At the same time, the lesson then learned has given the paper industry a prominence in the Washington picture that it did not have at that time. Already there are anticipatory discussions of personnel to be drawn from industry for Washington duties.

There have been announcements that in the present emergency there will be no unit equivalent to the War Production Board, but that instead the functions of such an agency will be assumed by existing departments, such as the Department of Commerce. It would not be an unmixed blessing to have production controls in the hands of bureaucrats with a cursory knowledge of paper industry problems. On the other hand, this might be better than a W.P.B. headed by civilians with no knowledge of the industry, just as

When Choosing Clutches and Brakes for Your Equipment, Look Over These
CHECK POINTS
OF FAWICK SUPERIORITY
In selecting clutches and brakes for your machinery, Fawick is your logical choice. Check these six points of Fawick superiority.
1 DRUM-TYPE AIR OPERATION
Fawick clutch and brake units provide a 360° friction surface and uniform-pressure, constant-velocity contact between the full width of the friction shoes and the drum. Greatest operating torque results from the application of operating pressure at the maximum diameter.
2 OPTIONAL CONTROL
Local or remote finger-tip control of instantaneous and smooth starting and stopping increases operating efficiency. Clutch or brake action can be sensitively regulated while units are in operation.
3 SELF-ADJUSTING
The rugged Fawick actuating element automatically compensates for wear of friction shoes. This insures complete engagement and dependable service from Fawick clutches and brakes.
4 LOW MAINTENANCE
Even friction-shoe wear reduces lost production time for clutch or brake maintenance. After long periods of satisfactory service, only the friction shoes need be replaced.
5 NO LUBRICATION
Fawick design and construction eliminate the problem of clutch or brake lubrication.
6 SPACE-SAVING
Space requirements for Fawick installations are minimized due to the small number of moving parts and elimination of mechanical linkages. All conventional mounting arrangements are made with a substantial saving of vital axial space.
A Fawick clutch or brake of the correct type and size to meet your machine design and operating requirements is the best solution to your application problem. Check with Fawick before you buy.
All desirable clutch characteristics are built into Fawick Airflex units
FAWICK Airflex CO., INC.
9919 CLINTON ROAD CLEVELAND 11, OHIO
FAWICK CLUTCHES = + + + = PEAK EFFICIENCY
AXIAL CONTACT 360° RADIAL CONTACT SHOCK ABSORPTION CONTROLLED TORQUE

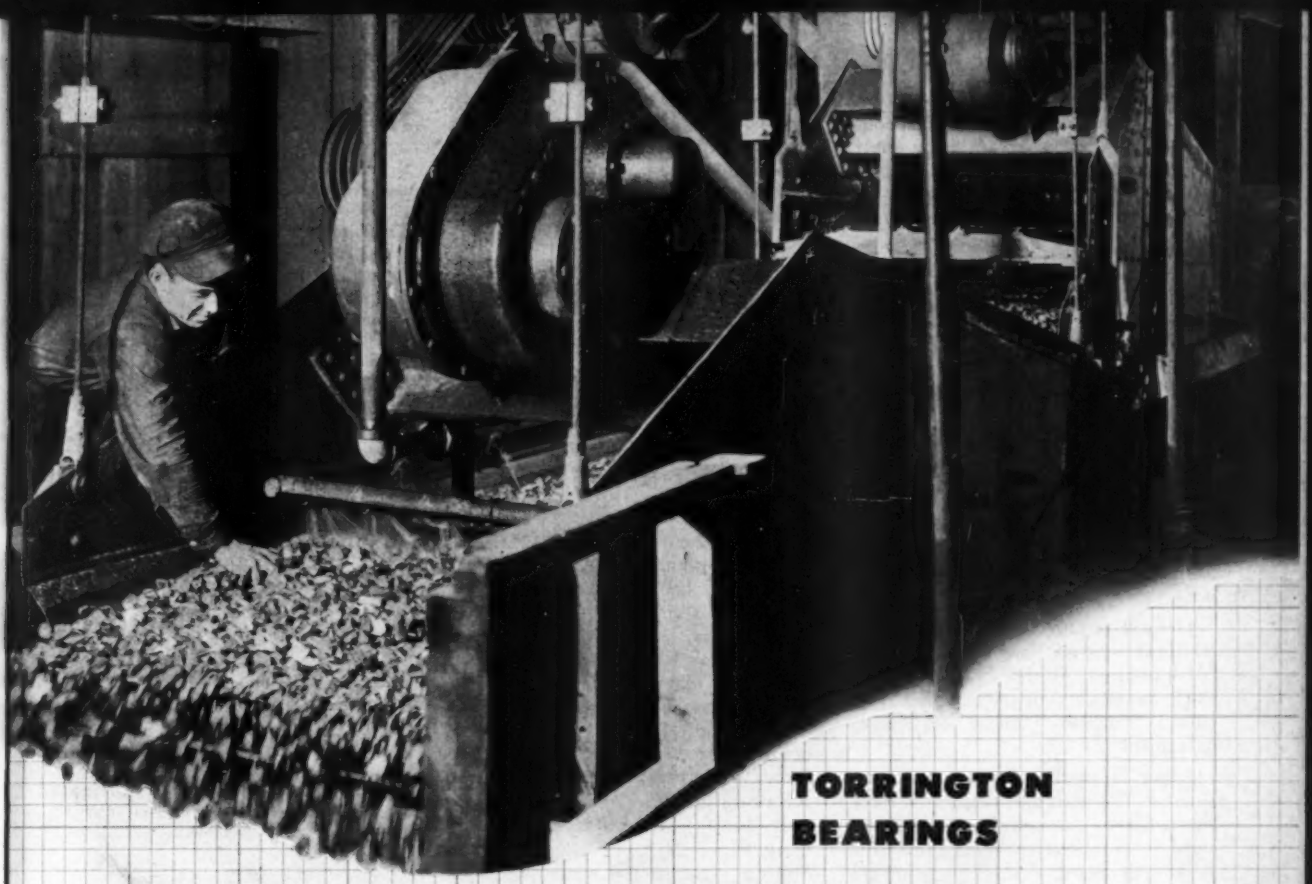
in the last war a customers man from a brokerage house was in charge of the paper section of the Board. At that time it was a pronounced policy that no individual of importance in an industry could be chosen for a key position in the branch where that industry was represented. In plain terms, Washington held that talented industrialists could not be trusted to do a patriotic job on commodities with whose production they were conversant. For the moment this theory seems to be quiescent. In World War II, men from the paper industry eventually were called upon for service to the War Production Board, but never in key positions in that Board.

Will industry be mobilized? Geo. Mead named on NSRB Committee

Returning to Washington policy developments, it can be said that there is a conflict in the Administration itself as to whether total industry mobilization is required, or whether piece-meal steps will be sufficient. The National Security Resources Board is planning its operations with a view to total mibilization. Opponents of the Administration program fear that government planners see a golden opportunity to impose nation-wide controls which will remain after the emergency passes. There are certainly prominent figures who wish to seize the opportunity to socialize the country. However, on the brighter side of the picture it should be noted that the NSRB has named a committee on mobilization which includes as one of its public representatives George H. Mead, past president of the American Paper and Pulp Association, former member of the War Labor Board and a member of the Hoover Commission on Reorganization of the Executive Branch of the Government. Mr. Mead, together with the presidents of the United States Chamber of Commerce and the National Association of Manufacturers are certain to be a restraining influence on any socialistic trends which may develop.

Present buying spree does not indicate demand

Hysteria and scare buying is certainly to be credited in part at least with present demand. With the entire industry operative at well over its rated capacity of six days a week, of twenty-four hours each, there is every indication that a production ratio of 105 per cent of rated capacity is not justified by current consumption. The mills are acting individually in an effort to check this buying spree. In many grades the mills are establishing individual controls of distribution, old-



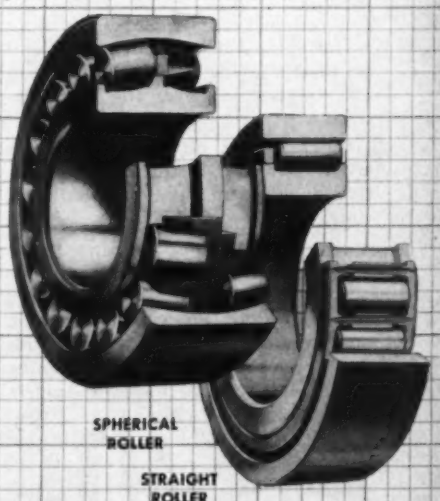
TORRINGTON BEARINGS

pass a tough screen test

Vibrating screens give a design engineer a tough problem in bearing selection. Satisfied with nothing less than the best screen performance, Allis-Chalmers engineers have devoted years of research in close cooperation with bearing manufacturers to develop precision bearings ideally suited to each specific screen application.

For example, in many Allis-Chalmers Ripl-Flo screens, two Torrington Spherical Roller Bearings are used to support the accurately-balanced eccentric shaft that imparts a perfect circle vibratory motion. Many Allis-Chalmers Low-Head screens utilize four Torrington Straight Roller Bearings to support the counterweighted shafts providing the straight-line vibratory motion. The results are high performance and low maintenance in both models.

It may pay you, too, to consult our engineers' special knowledge of all major bearing types in connection with *your* friction problems.



SPHERICAL ROLLER

STRAIGHT ROLLER

THE TORRINGTON COMPANY

South Bend 21, Ind. • Torrington, Conn.

District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON BEARINGS

SPHERICAL ROLLER • TAPERED ROLLER • STRAIGHT ROLLER • NEEDLE • BALL • NEEDLE ROLLERS

time customers being allocated output in proportion to their normal consumption. New buyers are given short shrift. In other grades, mills are adopting a policy of accepting orders at prices current at time of delivery only, and these must be firm orders not subject to cancellation. Neither of these methods of curbing hysteria buying are being adopted by agreements between mills, but are individual efforts to restrict sales to those who are actually entitled to paper on the basis of past purchases. Even at this, mills in most grades are operating with backlogs of seldom less than eight weeks ahead of the machines. The paper industry generally has not taken advantage of the speculative demand to materially increase prices. Some instances of increases of 2 to 3 per cent have been reported.

Defense requirements are certain in no short time to have their effect on transportation. Withdrawal of rolling stock to move military supplies will curtail available tonnage for paper movement.

Labor is another factor to be considered. The draft and recall of reserve personnel to the colors will have its impact on operative staffs, and this is already being felt. The principal effect so far has been in the basic field of wood cutting. The employment of thousands of men at Pacific coast airplane factories is drawing men from the woods to the more lucrative jobs in war plants. A shortage of wood, and therefore a curtailment of pulp output is a certain result, though it may not be felt immediately. Labor control will be a factor in any Washington move to exercise controls over the paper industry.

These phases do not comprise the whole picture, but are merely indicative of what may be expected — in time.

The first branch of the paper industry to actually feel the impact of the Korean war is the paperboard and paper box group. Production has leaped, and more is to come. Some reasons for this development are that a tightening of tin supplies will force the switching of much packaging to paperboard. Diversion of chemicals to war uses will throw plastics out of the packaging field, and substitute paperboard. War materials shipping will require stronger and heavier packages, cutting down the amount available for civilian use. The expansion of the use of the V-box will increase, and more paperboard per package will be required.

There are one or two bright spots in the picture. The settlement of a western strike in the woods will temporarily relieve the pulp mills of their present wood shortage. Strikes in the salt cake field are expected to be settled, relieving another shortage. Chlorine, however, will be short, and the mills are already considering the probability that they will have to modify their brightness specifications for various papers.

RFC lists paper company loans

The Celler investigation into the newsprint industry has been completed, and the projected inquiry into pulp production and operations in other branches of the industry has not begun. Legislation which is likely to be proposed by Mr. Celler's sub-committee of the House Judiciary Committee is certain to arouse opposition, because of his known attitude that big business in itself is evidence of monopolistic practices. Meanwhile, evidence has been given his committee of the extent to which the Government has made loans to facilitate newsprint production. The Chairman of the Board of the Reconstruction Finance Corporation has listed the following loans:

A direct loan of $500,000 to the Gary Paper Mills of Gary, Ind., to build a plant to use waste paper for newsprint production.

A direct loan of $500,000 in 1935 to the Inland Empire Paper Co. of Millwood, Wash., a second loan of $300,000 to refund an unpaid balance of $150,000 on the first loan, and after this loan was repaid another direct loan of $500,000 was granted.

Loans totaling $1,800,000 have been granted this year to the Pacific Paperboard Co. at Longview, Wash.

A loan in 1945 of $2,125,000 to the Southland Paper Mills of Lufkin, Tex., has been closed with the refunding of an unpaid balance by banks which assumed the outstanding amount.

Lessons learned from the Dominion strike

A stockpile of nearly 90,000 tons of newsprint accumulated during the recent nine-day railroad strike in Canada. Emergency legislation enacted by Parliament ended the strike just 19 minutes after the special government back-to-work order became a law.

Before the order, the prospect was grim; Canadian mills faced the prospect of closing down—they could not keep operating indefinitely. U. S. newspaper publishers began to feel the old wartime pinch of depleted newsprint supplies. But, according to R. M. Fowler, Newsprint Association of Canada's president, not a single newsprint mill was forced to close down.

Financial

▶▶▶ THE SECURITIES MARKETS have recovered the losses sustained when the Korean outbreak caused a sharp break in quotations. Present price averages have returned to about the high figures registered since 1946.

American Boxboard Co.—Net earnings for the first half of 1950 were $317,480 as compared with $303,845 a year ago.

A.P.W. Products—Net income for six months ended June 30 was $33,410, as compared with a deficit of $146,320 for the same period in 1949.

Certain-teed Products Corp.—Net income for six months ended June 30 was $2,532,874 as compared with $1,897,141 a year ago.

Champion Paper and Fibre Co.—Net income for three months ended June 30 was $2,665,650 as compared with $1,991,368 for the same quarter in 1949.

Container Corp. of America—Net income for six months ended June 30 was $1,558,907 as compared with $1,496,028 a year ago.

Eastern Corp.—Net income for six months ended June 30 was $607,509 as compared with $62,682 for the same period in 1949. On the basis of increased earnings the company has resumed payment of dividends to stockholders.

Gaylord Container Corp.—Net income for six months ended June 30 was $2,385,993 as compared with $2,361,764 a year ago.

Great Northern Paper Co.—Net income for six months ended June 30 was $1,732,335 as compared with $2,861,845 for the comparable period in 1949.

Hinde & Dauch Paper Co.—Net income for six months ended June 30 was $1,320,970 as compared with $1,208,174 for the same period in 1949.

Hollingsworth & Whitney Co.—Net income for twenty weeks ended July 2 was $653,065 as against $908,470 for the comparable period in 1949.

International Paper Co.—Net income for sixe months ended June 30 was $33,767,240 as compared with $24,649,329 a year ago. Income for the second quarter was $17,471,992 as compared with $10,834,498 a year ago. On the basis of increased earnings the company has increased the dividend rate in cash as well as granted a 25 per cent stock dividend.

Keyes Fibre Co.—Net income for six months ended June 30 was $603,138 as against $325,529 a year ago.

National Container Corp.—Net income for six months ended June 30 was $1,854,026 as compared with $1,138,605 a year ago.

Oxford Paper Co.—Net income for the first half year was $1,117,109 as compared with $805,960 a year ago.

Philip Carey Manufacturing Co.—Net income for the first six months of 1950 was $1,399,509 as compared to a profit of $1,042,510 for the same period in 1949.

Puget Sound Pulp and Timber Co.—Net income for six months ended June 30 was $917,953 as compared with $867,142 a year ago.

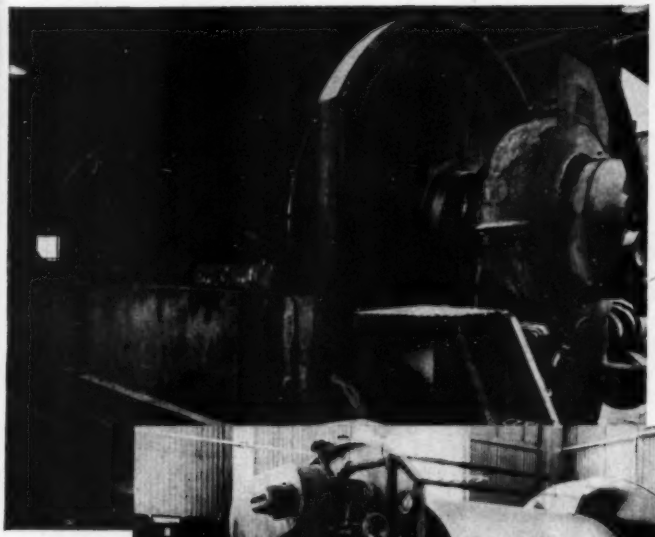
Rayonier, Inc.—Net income for the six months ended June 30 was $6,629,183 as compared with $3,482,931 a year ago.

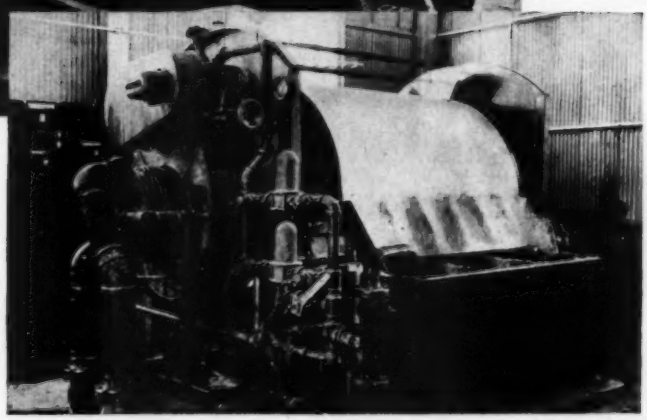
Riegel Paper Co.—Net income for twenty-

OLIVER LIME MUD FILTER

The chemical filter designed to do a **chemical** filtering job

Study these two installation pictures of Oliver Filters. One is handling lime mud in a southeastern kraft mill; the other is handling potash in a west coast chemical plant. Note the similarity of design. Materials of construction will vary, of course, to meet specific conditions. But both are distinctly Oliver "Chemical" Filters.





As for "experience", we can point to nearly a hundred Oliver Lime Mud Filter installations in pulp and paper mills as well as to several thousand Oliver "Chemical" Filters in industry generally. Yes, there's plenty of "chemical" filtering experience back of the Oliver Lime Mud Filter you are planning to buy. Plenty of that necessary chemical filtering "know-how."

OLIVER UNITED FILTERS INC.

New York 18, N. Y.
33 West 42nd Street

Chicago 1, Ill.
221 N. LaSalle Street

Western Sales Div:
Oakland 1, Calif.
2900 Glascock Street

Sales & Manufacturing Representative:
E. Long Limited, Orillia, Ont., Canada

San Francisco 11, California

Factories: **Oakland, Calif. • Hazleton, Pa. • Orillia, Ont., Canada • Melbourne, Australia**

Any of these "Proven Operators"

- ✓ Westinghouse, Bendix Westinghouse
- ✓ Barber-Colman, Cutler-Hammer and Philadelphia Limitorque motors
- ✓ All pneumatic motors
- ✓ Air loaded pneumatic motors
- ✓ All double and single action air cylinders
- ✓ Mechanical springs

may be used with HILLS-McCANNA Diaphragm Valves for automatic or remote operation

The extreme flexibility of Hills-McCanna diaphragm valves makes it possible to satisfy virtually any preference or requirement in the use of mechanical operators. All of the operators listed above plus others are applied to standard Hills-McCanna sliding stem valves to provide complete units that utilize your existing operating methods.

Designed especially for conveying "hard-to-handle" fluids such as acids, alkalis, volatile and viscous substances, slurries, semi-solids, etc. Hills-McCanna diaphragm valves give you the advantages of "special" design on a standardized basis. Sizes range from ⅜" through 14" (not all methods of operation are available in all sizes); pressure up to 150 psi; temperatures to 180°F. (some applications to 220°F.). Write for complete information, HILLS-McCANNA CO., 2433 W. Nelson Ave., Chicago 18, Ill.

HILLS-McCANNA

Saunders patent diaphragm valves

Proportioning Pumps

Force-Feed Lubricators • Magnesium Alloy Castings

six weeks ended July 2 was $833,475 as compared with $432,828 for twenty-four weeks ended June 19, 1949.

Robert Gair Co.—Net income for the first half year was $4,065,725 as compared with $3,538,527 a year ago.

Scott Paper Co.—Net income for six months ended July 2 was $3,730,116 as compared with $2,519,542 a year ago.

Sorg Paper Co.—Net income for six months ended June 30 was $338,901 as against a deficit of $111,035 for the same period a year ago.

Southern Advance Bag & Paper Co.—Net income for twenty-six weeks ended July 1 was $1,181,943 as compared with $1,031,923 for the like period a year ago.

Sutherland Paper Co.—Net income for six months ended June 30 was $1,280,696 as compared with $855,847 for the same period in 1949.

Union Bag & Paper Co.—Net income for six months ended June 30 was $4,864,208 as compared with $3,258,016 a year ago. Income for the second quarter was $2,514,813 as against $1,091,280 for the same quarter in 1949.

West Virginia Pulp & Paper Co.—Net income for nine months ended July 1 was $8,100,615 as compared with $6,552,718 for the same period a year ago.

Paper Mill Corporate Changes

Scott Paper Co. has split its capital stock as of July 27 with each holder of common stock receiving two shares for each share previously held.

New York Stock Exchange—Stocks

Closing Prices

	August 21	July 20
A.P.W. Products	* 4¼-4⅞	4
Celotex	15⅝	14⅛
Same Preferred	16¼	16
Certain-teed Products	14⅛	12⅜
Champion P. & F. Co.	41	34⅝
Same Preferred	*104-105½	105
Chesapeake Corp.	34⅝	* 28¾-29¼
Continental Diamond	9⅞	8⅝
Container Corp.	49⅝	45½
Same Preferred	*102-103	*105-106
Crown Zellerbach	37⅝	35
Same Preferred	103⅝	104½
Same $4 Preferred	111-116	*104½-106
Dixie Vortex	43⅛	* 37½-39
Same "A"	51	54
Eastern Corp.	15⅝	14¼
Robert Gair	8⅞	8⅝
Same Preferred	* 17¼-17¾	* 17⅜-17½
Gaylord Container	20	18
International Paper	57¼	43⅛
Same Preferred	*108-109	*104½-106
Kimberly-Clark	38	34½
Same Preferred	153	*137-140
McAndrews & Forbes	38	37
Marathon	33	28⅝
Masonite	53½	49⅞
Mead Corp.	25⅛	20⅞
Same Preferred	* 91-93⅛	87½
Same 2nd Preferred	50⅛	* 40⅝-44
National Container	9⅛	7⅝
Paraffine Cos.	15⅝	14⅜
Same Preferred	* 98½-99½	* 96-100
Ravonier, Inc.	39¼	32½
Same Preferred	34⅝	* 32-32¾
Scott Paper (new)	44¼	83½
Same $3.40 Preferred	* 99¾-100	* 99½-100½
Same $4.00 Preferred	107⅛	*107-108½
St. Regis	10	9¾
Same Preferred	* 94-94½	86
Sutherland Paper	* 44-45	36½
Same Preferred	*113¾-114½	*105¼-105¾
Union Bag & Paper Co.	33⅞	29½
Union Board & Carton	12	9¼
United Wall Paper	3	2⅝
Same Preferred	24½	* 23-25
U. S. Gypsum	106	97¾
Same Preferred	*184-187	*181-184
West Va P & P Co.	60⅝	48
Same Preferred	*108-109	*107-108

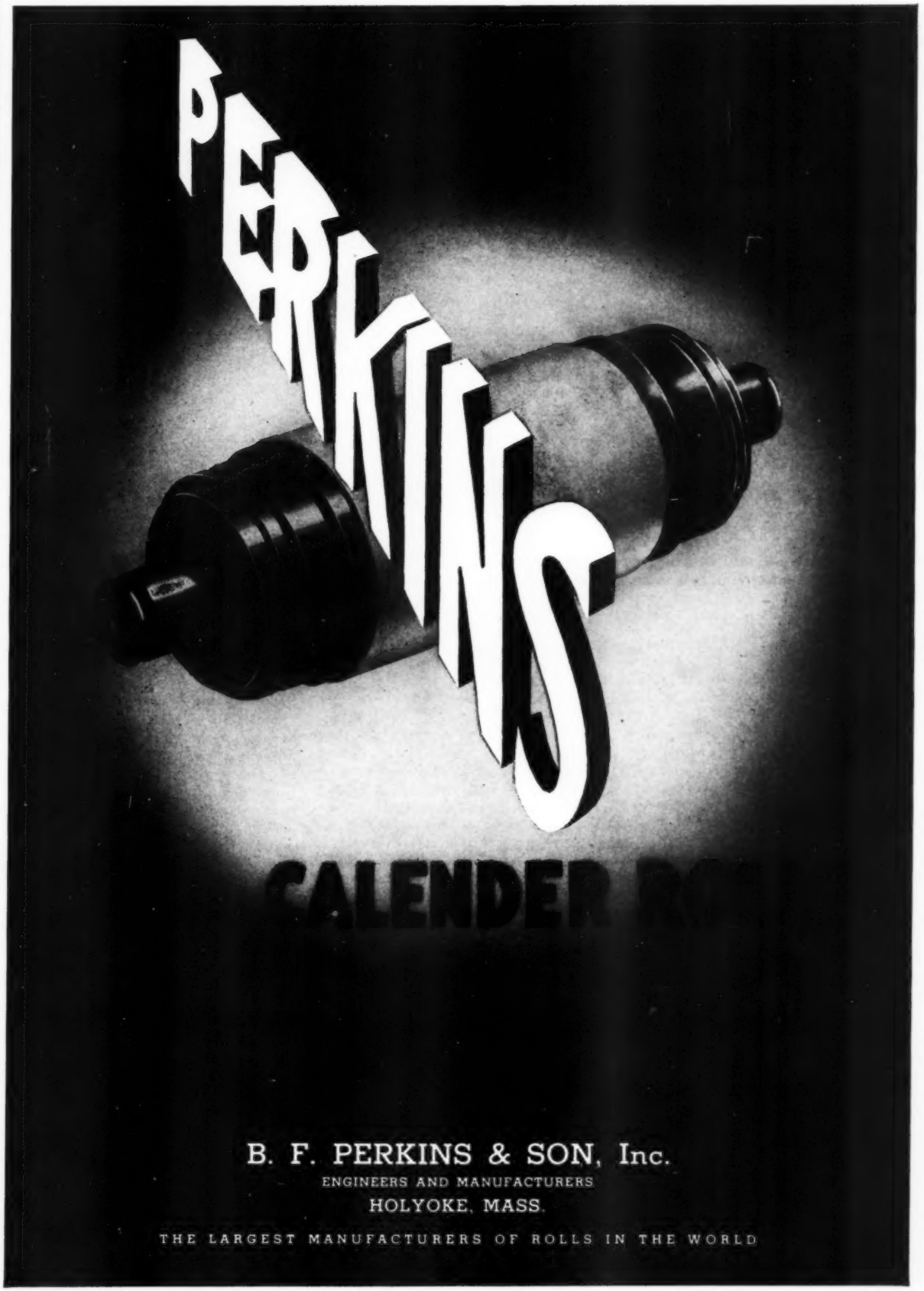
New York Stock Exchange—Bonds

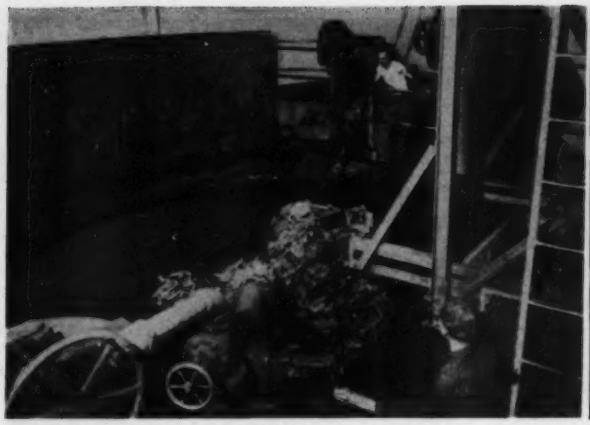
	August 21	July 20
A.P.W. Products 3%	83	*
Celotex 3¼%	102	.....
Champion P. & F. Co. 3%	103	103
Mead Corp. 3%	107¼	.....

New York Curb Exchange—Stocks

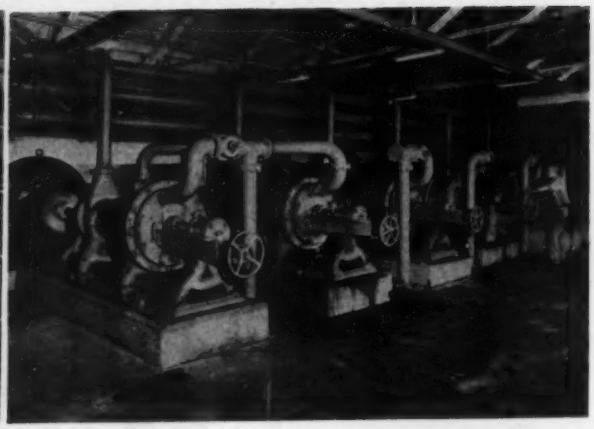
	August 21	July 20
Am Writing	* 7¼-7⅝	7
Great Northern	44	39½

* Closing Bid and Asked Prices


PERKINS
CALENDER
B. F. PERKINS & SON, Inc.
ENGINEERS AND MANUFACTURERS
HOLYOKE, MASS.
THE LARGEST MANUFACTURERS OF ROLLS IN THE WORLD



Twenty-foot Hydrapulper. Facing camera, Alfred Wolf, Hydrapulper operator; Back to camera, Harold Sein, beater engineer



Battery of six jordans in stock preparation department; Joseph White, operator

National Gypsum 25th anniversary

Paper mill in Kalamazoo—latest of company plants completely modernized

▶▶▶ THE STORY OF the National Gypsum Co. began in 1926, in a basement room in Buffalo, N. Y. The first product manufactured was gypsum board, sold under the company's trade name Gold Bond.

This year, on August 30, the company celebrated its 25th anniversary with open house programs at each of its 23 plants located throughout the United States. These plants all were built or acquired in the short period of 21 years and more than 150 products for the building industry and for other industrial uses are now manufactured and sold under the Gold Bond label.

Uniform high quality of paper was needed for its products, and the company entered the field of paper manufacture to make paper for its own use. The paper mill in Kalamazoo, Mich., is the most recent addition to the National's paper group, having been acquired in 1946 from the old Western Board and Paper Co.

In the beginning, a comprehensive engineering program was set up to rehabilitate the entire plant, and a thorough study and survey of all equipment and processes was made. The detailed engineering was completed in the spring of 1947 and the work on the project started immediately thereafter. This project involved every department in the plant, starting from the point of receipt and storage of raw materials; stock preparation, including pulping and refining; paper machine, including screening, formation, pressing, drying, calendering, winding and rewinding; finishing; and shipping.

In addition to these manufacturing departments, extensive rebuilding and new equipment was required for the following service departments: steam generation, electrical maintenance, employees' facilities and offices. L. L. Hank is plant manager and directed the entire reconstruction job; he also was in charge of the open house anniversary program.

The Kalamazoo project now has been completed. In view of the large demand for this special paper by the company's plasterboard plants, it was necessary that the entire modernization program be carried out without any loss of production. During this entire period (almost three years) and since acquisition of the property, the plant always operated an average of six days or more per week. By thorough and detailed planning, the entire rebuilding of the plant was done without any lost time whatsoever. With the exception of new building and chest construction, and electrical distribution installation, all the engineering and work of modernization was done by National's own plant organization.

One unique feature of this plant is that there is no storage provided for the finished product. The huge six-foot rolls are taken directly from the rewinder to boxcars on the siding at the loading dock immediately adjacent to the finished end of the paper machine.

The output of the plant was around 90 tons per day when it was taken over by the National Gypsum Co. At present, the production is about 127 tons per day. Last year, the output was 38,000 tons of paperboard.

Receiving and Warehousing

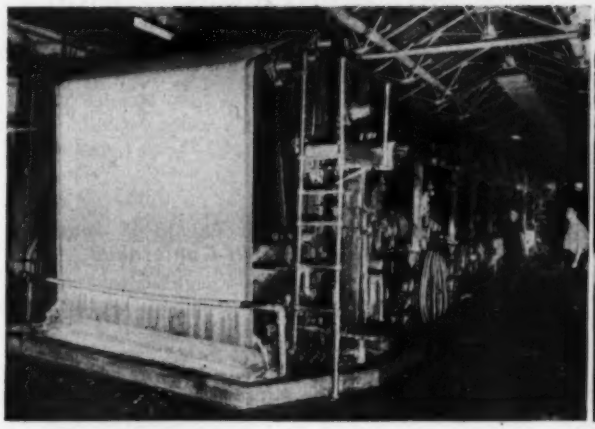
This department handles 45,000 tons of incoming materials annually. To expedite the unloading and warehousing of this tonnage, new forked power trucks were placed into service. Floors were repaired or replaced. All unloading docks were resurfaced. New roof coverings were applied.

Stock Preparation

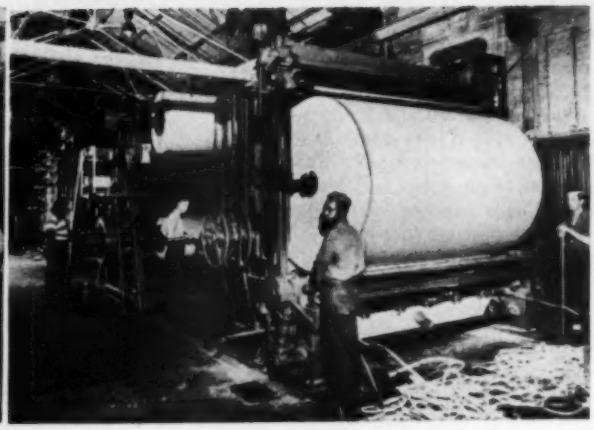
A complete new Shartle filler stock system with a rated daily capacity of 150 tons of paper stocks was installed. This equipment consisted of a twenty foot diameter Hydrapulper, loaded and fed by automatic skip hoist and car, self cleaning stock settling equipment, steel stock flow channels, and three pulp thickeners. Two new tile stock storage and water recovery chests and pumps were erected. All tile chests were built by Kalamazoo Tank and Silo Co.

A completely new and rebuilt 50-ton per day top and bottom liner stock system, consisting of three Holland type beaters with perforated backfalls and vertical stock pumps, were installed.

Buildings were enlarged, new steel trussed roofs and new concrete floors were constructed to accommodate the installation and use of the above equipment.



Wet end of 100-inch paperboard machine; Raymond Hay, machine tender; Leon Miner, tour supervisor



Dry end and rewinder. Isom Buchanan, winderman; Glavis Goff, backtender; Willie Scott, Jr., third hand, and Robert Statler, spare man

marked with open house at 23 plants

Three new tile stock chests, each with new Shartle centrifugal pumps and agitating equipment, Bird consistency regulation and Taylor level control instrumentation were erected and installed. Connected to these pumps is a new battery of six Jordan refiners all with antifriction bearings, each driven with large synchronous motors equipped with modern pushbutton control and ammeters, along with a continuous circulating, three stock, six range flexible piping system. New concrete floors have been laid throughout this department.

Paper Machine

The 100-inch Beloit paper machine has been completely overhauled.

All machine stock pumps have been rebuilt or replaced. A new steel three stock regulating box and eight new 14-plate, Bagley & Sewall flat screens, along with reject recovery system, screen and vat mixing boxes, and all new piping were installed. Each screen is individually motor driven with V-belt drive. These drives are separated from the screens by a curtain wall to prevent damage by water.

Two Moore & White 42-inch cylinders and vats, and individually driven fan pumps and piping have been added, thus making an eight-cylinder machine. Each cylinder is equipped with new hydraulic operated oscillating water showers and water deckles supplied by a new separate well and pump delivering 125-lb. pressure water.

Variable speed power is supplied to the machine by a new 225-ft. line shaft equipped with antifriction bearings all supported by new steel reinforcement, and accessible by steel catwalks and railings.

All calender rolls and some of the dryers are equipped with new doctors having lightweight flexible blades.

Paper is wound on a new two drum Beloit reel with Horton clutches and water-cooled friction brakes.

A Langston rewinder with constant torque variable speed drive up to 1500 fpm. and producing finished rolls six feet in diameter has been placed into operation.

Finishing and shipping

A new 6000 lb. capacity Clark industrial power truck has been placed in service, loading for shipment an average of 125 tons of paper per day. A new loading dock has been constructed.

Slushed stock and water piping

A completely new stock and whitewater piping system has been installed throughout the plant, as well as most fresh water lines.

A new whitewater system, consisting of chests, pumps, controls, heating arrangements, etc., has been placed into service.

Three new water wells have been drilled, pumps and piping installed and covered with new housing.

A new trench-type grating covered waste water sewer was constructed throughout the processing departments.

Steam Generation

This department has had very extensive rehabilitation. To begin, four boilers, bunkers, two reciprocal steam engines and miscellaneous steam equipment were dismantled and removed.

New, fire proof, steel trussed roofs were erected, various walls constructed and concrete floors were laid. New steel catwalks, stairs and railings were installed throughout the boiler room.

Two Wickes boilers were completely rebuilt. New equipment installed consisted of—Forced draft fan with dual automatic drives, hot lime and soda process water softening system, completely automatic combustion controls, fresh air intakes, turbine driven boiler water feed pump, air compressor installation, steam turbine dual drive to induced draft and vapor absorption fans, spiral coal conveyors and other miscellaneous devices.

Electric power distribution

A section of the plant was rebuilt to accommodate a complete new battery of power transformers, 2000 kv-a. capacity, and all new automatic pull out drawer type switchgear and metering equipment.

The plant was completely re-electrified with new conduit and wiring, distribution boxes and panels. Most all equipment throughout the plant has new automatic controls with push button starting and stopping. All controls have safety switches. All electric plug outlets are a three wire system with one wire going to ground for safety. 36,000 kw. hrs. are consumed daily.

A completely new, plant-wide lighting system, with fluorescent fixtures has been installed.

Maintenance department

This depatrment has been completely rehabilitated. All equipment has been or is being rebuilt, equipped with individual motors and relocated for more efficient use. A new lathe and milling machine equipment is on order. New welding equipment and many other small tools have been added.

A new concrete floor has been laid.

Storeroom

This stockroom for repair parts and supplies has been renovated and new steel shelving installed. It is maintained by a storekeeper.

Employees' facilities

A new employees' locker and washroom was built. It contains all new steel lockers, toilets and shower facilities and is maintained in a highly sanitary condition.

Office

The office is of modern arrangement with an air conditioning system throughout. It is equipped with all new steel and wood desks, tables, chairs, filing equipment and various types of office machines. An equipped conference room has been provided. The entire plant is equipped with an auto call system controlled from the office.

Fire protection

The entire plant has been equipped with fire prevention and protection devices, such as extinguishers, hoses and hydrants, automatic sprinklers and alarms. Fire brigades made up of various employees have been trained and fire drills are held at various intervals. These brigades were trained under direction of local fire department authorities.

Plant housekeeping

Three years ago we set up an intensive plant-wide housekeeping program. This required thorough training and direction by all of our supervisors and the full cooperation of all employees. It has paid dividends of many sorts. The working environment of all the employees has been vastly improved, fire and personal hazards have been held to a minimum, lost time of production is extremely low, equipment is maintained in top condition and, quite important, there has been a remarkable improvement in the quality of our product.

Plant color scheme

Inside Painting—Walls, ceilings and all equipment in every plant department have been cleaned and repainted. Painting upkeep is carried on continuously.

Paper Machine Department—Walls light sandstone with tan dado, and ceiling white; all process equipment is red.

Switchgear Department—Walls white with grey dado and ceilings white; switchgear equipment grey.

All Other Departments—Walls light frost green with moss green dado, ceilings white. All process equipment and piping light moss green.

General Plant—Electrical equipment such as motors and controls royal blue. All safety hazards, railings, equipment on wheels painted safety yellow. Steam lines, black.

Safety and accident prevention

When the Kalamazoo plant was acquired in 1946, the National Gypsum Co. inaugurated a program to improve a very bad safety record. Listed chronologically below is accident frequency history since that time:

Six months to July 1946—	158
Year 1946—	78
Year 1947—	7.5
Year 1948—	10.3
Year 1949—	4.0
Six months to July 1950—	0.0

First, it was necessary to educate all employees to work safely, to use tools, equipment and material in the proper and safe manner, to correct unsafe practices and acts. Secondly, all employees were required to have a complete physical examination. Any found to have health deficiencies were counseled and assisted on the path to better health. All those with subnormal eyesight were supplied with prescription eyeglasses furnished by the company. Thirdly, a safety committee was established, meeting every month, and presided over by the safety supervisor. Department supervisors are permanent members and an employee from each department serves for a period of three months. The safety program has been actively supported by the Union. In addition to the regular safety committee, each supervisor calls a meeting once each month for all employees under his direction, to discuss safety and general ideas for improvement.

Lastly, every piece of equipment that study reveals has even the slightest hazard to safety has been properly guarded. Protective clothing, goggles and other equipment is furnished to all employees requiring the need of same when doing hazardous work.

In 1950, to date, the Kalamazoo plant is tied for first place in the National Safety Contest for paper mills of its size, and is in third place among the 23 National Gypsum plants.

Personal acknowledgment

Those that have been and are carrying the major load of responsibility for this achievement are: L. L. Hank, E. M. Baker, J. D. Farnsworth, J. D. Hartleroad, Leon Miner, F. R. Mooney, Otis Mumma, E. E. Nooe, D. F. Otten, W. J. Sprau, J. L. Waber, Arthur L. Workentine, Ray H. Wilcox, Maurice M. Yeazell, Joseph White, Chief Union Steward, and his Union Committee.

Freedom Is Theme of Annual Hammermill Conference

The thirty-seventh annual conference of Hammermill Paper Co. agents was held at Erie, Pa., August 22-25, with an attendance of 176.

The spirit of teamwork which has been evidenced at former conferences took on a special note this year. The general theme of freedom and the essential part the fine paper industry may play in the country's defense against communism was brought out by those who took an active part in the program.

Company speakers heard during the sessions were: Norman W. Wilson, president; Donald S. Leslie, first vice president and general manager; John D. Zink, vice president and director of merchandising; Grant Richardson, manager of sales; Mortimer E. Graham, secretary; A. Ellis Frampton, manager of advertising and sales development.

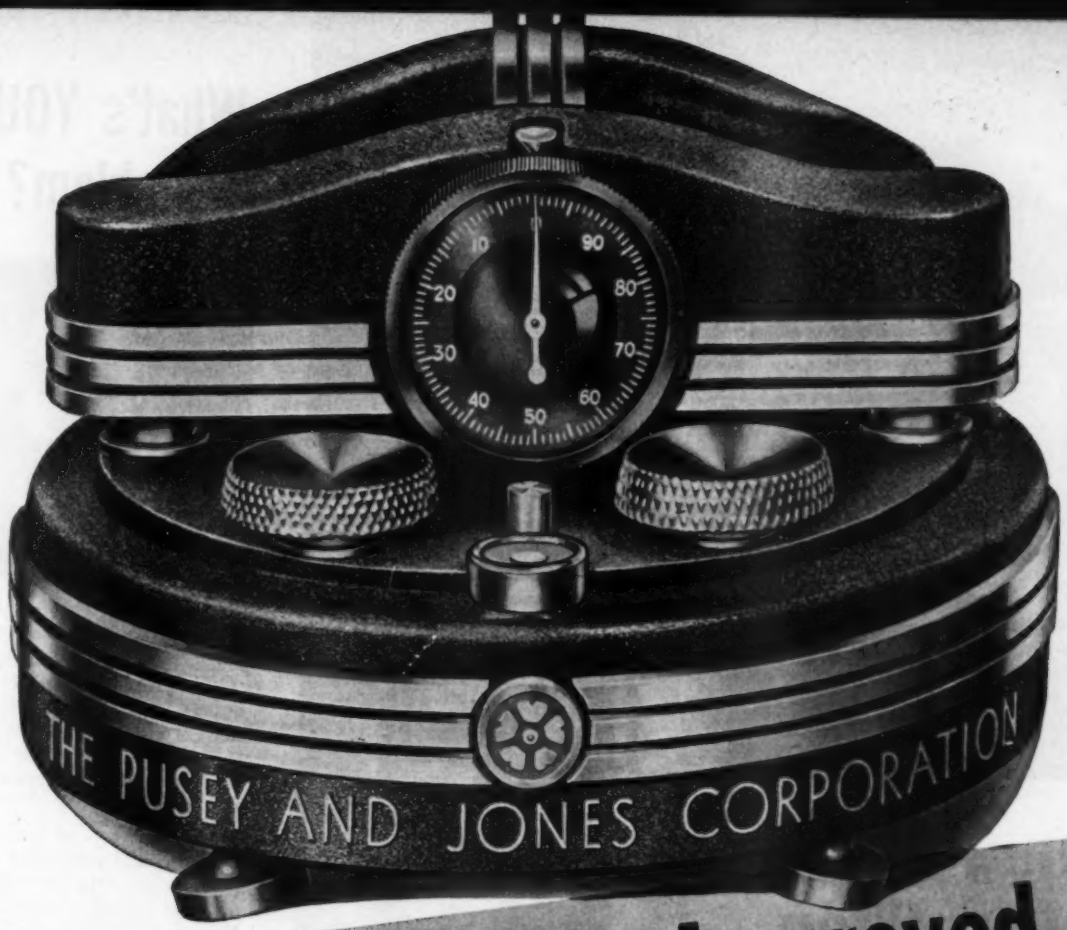
For a number of years, Bruce Barton, nationally-known columnist, author, and chairman of the board, of Batten, Barton, Durstine, and Osborn, Inc., has been a guest speaker at the Hammermill conferences. This year, Mr. Barton spoke informally of international affairs, and in the course of his remarks he said: "The United Nations is worth preserving and was worth starting because it represents a great ideal, but we must get away from expecting too much of it too soon."

The serious business side of the conference was broken by mill visits, golf matches, and other games.

Riegel Carolina Co. Will Build Bleached Sulphate Pulp Mill in N. C.

A wholly-owned subsidiary of Riegel Paper Corp., New York, the Riegel Carolina Corp., will build a bleached kraft wood pulp mill of 200 tons daily capacity on the Cape Fear River adjacent to the 150,000 acre Waccamaw Forest purchased by Riegel in 1937. Riegel has secured stockholder approval for financing of the new mill at Acme, N.C. Engineers are the J. E. Sirrine Co., Greenville, S.C.; construction contracts have been awarded to C. M. Guest & Sons, Greensboro, N.C.

The $13,500,000 project is scheduled for completion by January 1, 1952. When in operation, the mill will employ approximately 250 men and will provide a market for over 100,000 cords of pulp-



Now . . . A New, Improved *Plastometer*

For measuring hardness of rubber-covered rolls

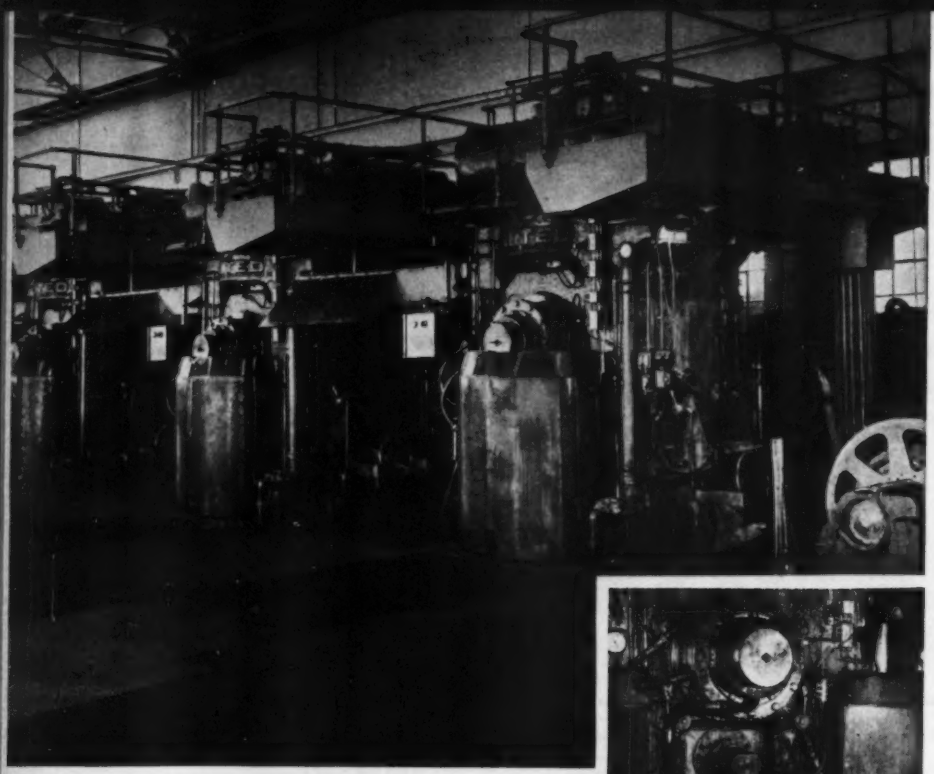
Puseyjones has developed a new improved streamlined Plastometer for wider use in the Paper and Rubber Industry, replacing the original instrument that served the Industry for the past 40 years. Now it is possible to measure the plasticity of rubber-covered lower press rolls while the roll is still in position on the machine. The new Plastometer is only *4 inches high* as shown above in actual size as compared with the 16-inch height of the older design. Several major design improvements are incorporated in the new Plastometer. It is compact, lighter in weight and easier to operate. Replace your old instrument with this more practical and modern type.

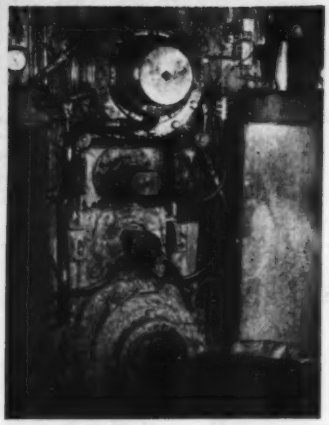
THE PUSEY AND JONES CORPORATION

Established 1848. Builders of Paper-Making Machinery

Wilmington 99, Delaware, U.S.A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY





Putting the "squeeze" on maintenance costs

IN this modern 5-stand tandem cold-rolling mill at a midwest steel mill, giant backup rolls squeeze strip steel to thousandths of an inch thickness. Taking the brunt of this punishing work are the end bearings on the rolls. Protection and proper operation of these bearings call for a lubricant that can really take it.

Recommended by a Standard Oil lubrication specialist, a STANOIL Industrial Oil has been used on these bearings for 1½ years of hard, continuous operation. Clean, effective lubrication, together with excellent maintenance practices by mill operators, has held bearing-upkeep costs to a minimum. The oil-circulating system, which includes two 6,000-gallon oil tanks, has remained entirely clean. STANOIL has shown practically no deterioration in use.

You can rely on this unique multi-purpose oil to give you the same, clean, dependable service in hydraulic units, speed reducers, and circulating systems. You can rely, too, on the expert, on-the-spot service of a Standard Oil lubrication specialist. How you can obtain his help, quickly and easily, is explained at the right.

Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Ill.

STANOIL
TRADE MARK
Industrial Oil

What's YOUR problem?

Warren Erickson, Lubrication Engineer at Standard Oil's Chicago office, helped this midwest steel mill (see left) make important savings through the use of STANOIL Industrial Oil on a cold-rolling operation. He was close at hand, gave mill operators engineering service when they needed it.

There's a corps of Standard Oil Engineers and lubrication specialists throughout the Midwest. You'll find one located near your plant. You can reach him simply by phoning your local Standard Oil Company (Indiana) office. His experience and special training will help you get maximum benefits from STANOIL and other outstanding products such as:

STANICUT Cutting Oils. These special-duty cutting oils meet today's most exacting requirements and highest production schedules. Grades vary in viscosity and compounding. Each contains the correct proportion of extreme-pressure and friction-reducing ingredients.

STANICOOL HD Soluble Oils. Because of additional compounding, these heavy-duty soluble oils possess the cooling ablity of an emulsion and also give better tool life and finer finishes than do conventional soluble oils.

STANOSTAMP Compounds. These widely accepted products have demonstrated their ability to handle heavy stamping or drawing operations of low-carbon or alloy steels. Each of the three grades is a paste compound to which water can be added to provide the most economical applications. STANOSTAMPS offer maximum protection for dies and work, can be readily removed in conventional washing equipment.

STANDARD OIL COMPANY (INDIANA) STANDARD

wood a year. Since part of Riegel Carolina's production will be sold on the market, it will supply about 50 per cent of the parent company's expanding wood pulp requirements. Riegel will continue to contract for substantial quantities of wood pump in the open market as heretofore.

Plans for the mill had been completed and purchase orders placed for the principal equipment items in advance of the opening of the Korean situation, but the uncertain international outlook makes the project all the more imperative, according to John L. Riegel, company president.

Expansion and Improvements Under Way at Brunswick

Plans for a $5,331,000 expansion and improvement program for its bleached wood pulp producing facilities at Brunswick, Ga., have been announced by Brunswick Pulp and Paper Co. The proposed expansion, to be financed by loans obtained from the New York Life Insurance Co. and a group of banks headed by J. P. Morgan and Co., Inc., will increase daily capacity from 290 to 400 tons of pulp.

Completion of the improvements will take from 11 to 15 months. All production of the enlarged facilities will be sold to the Brunswick firm's co-owners, Scott Paper Co. and Mead Corp. The Brunswick plant began operations in 1938, with nearly $7,000,000 since invested in increased facilities.

Newsprint & Kraft Board Mill To Be Built in Alabama

A project recently announced is that of a newsprint and kraft board mill which will be constructed at Naheola, Alabama, by the Choctaw Pulp and Paper Co., of Butler, Ala. The site of the new plant is near Butler.

The Meridian and Tombigee Paper Mill is the name of the new company organized to operate the mill. It will take approximately two years to complete the plant which will cost $40,000,000. Estimated capacity is 100,000 tons of newsprint and 100,000 tons of 16 pt. kraft board.

FINAL EXPANSION PLANS of the Western Waxed Paper Co., as approved by the executive committee of the Crown Zellerbach Corp., provide for the gummed tape division becoming the Western Gummed and Coated Products Co. Headquarters of the gummed coated company will be North Portland, Ore. A. S. Hamond is manager of the new company and O. R. Johnson is assistant manager in charge of sales and operations.

WMC Pulp and Paper Technology Dept. Opens Third Year—Daniel Lent To Assist Dr. Nadelman

▸▸▸ ADDED COURSES, additional equipment and a doubled enrollment of students marks the opening of the third year of Western Michigan College's pulp and paper technology department. Two years ago when the department opened there were eight students enrolled in the curriculum; this year, in addition to the 29 sophomores, juniors and seniors already enrolled, applications have been received from 28 additional students for admission to the course. Of these, 18 are freshmen and 10 are transfer students.

The course's first graduates will receive their bachelor of science degrees; as things now stand 10 chemistry majors who have specialized in pulp and paper technology will constitute the graduating class.

Twenty-nine students are working in mills throughout the country for the required mill practice experience. The summer employment committee, headed by Fred C. Goodwill, resident manager of St. Regis Paper Co. (Kalamazoo), is one of the many facets of the school and its curriculum in which industry is of valued assistance. Originally, the pulp and paper department was brought into being through the efforts of technical men of the Kalamazoo River Valley. Much of the laboratory equipment was obtained by them on a donation basis from the paper industry and allied fields.

Assistant professor appointed

Increased enrollment and expanded laboratory facilities have prompted the addition of an assistant professor, Daniel V. Lent, to the staff of Dr. Alfred H. Nadelman, head of the department. Mr. Lent, a graduate of the New York State College of Forestry at Syracuse University, received his M.A. from the same school in 1950. Mr. Lent's graduate study was done in the field of wood chemistry; his thesis on "The Polymerization of Four-Vinyl Guaiacol and Related Compounds" was presented at the Lignin Symposium of the American Chemical Society in Chicago this month.

As a graduate assistant, Mr. Lent had teaching experience in pulp manufacture and pulp testing as well as in organic chemistry. Practical paper mill experience was gained with summer work at International Paper Co., Livermore Falls, Me., and with Hammermill Paper Co., Erie, Pa.

The staff of the pulp and paper department will also be augmented by the addition of one or two laboratory assistants to help in preparation of laboratory courses.

Increased enrollment and advanced standing of students already enrolled has led to new courses which will be offered for the first time this year. Two combined lecture and laboratory courses, "Bleaching, Pulp Purification and De-Inking" and "Auxiliary Equipment for Pulp and Paper Mills," as well as a senior thesis preparation course, will begin this fall; in the spring "Chemistry and Technology of Plastics" and "Converting of Paper" also will be offered.

Alfred H. Nadelman

Daniel V. Lent

Industry men will be assisted by the school's staff in presenting "Auxiliary Equipment for Pulp and Paper Mills," and "Converting of Paper." In order to accommodate the four new courses, much new equipment has been added. Part of the cost of the new equipment came from funds provided by the industry when the department was first instituted, and part came from the state. Total expense for new equipment is about $5000, and includes:

Pulping equipment—a stainless steel vertical digester, a laboratory flat screen and a Bauer laboratory refiner.

Paper and pulp testing equipment—A TAPPI sheet mold (in addition to one already obtained), a Williams hydraulic sheet press, a low range tensile tester (in addition to one already available), a Clark softness tester, equipment for determination of cuprammonium viscosity, a *p*H meter (line operated) and a torsion balance.

Microscopy equipment—A micro slide projector, a micro slide warmer and additional microscopes.

Coating equipment—A Hobart mixer, a Day mixer, a Brookfield viscometer, a Martinson coating machine and equipment to determine the particle size of clay.

This year two scholarships will be available, one set up by Maxwell D. Bardemen, president of Lee Paper Co., for the company, and another established by the Paper and Twine Association. In addition, the Kalamazoo Valley Section of TAPPI has set aside $300, to be given at the rate of $100 per year to the student making the highest grades in the curriculum the year previous, providing he returns to the study.

Extensive Modernization Program at Thilmany Pulp & Paper Co.

▶▶▶ MAJOR IMPROVEMENTS of facilities, and equipment modernization, were announced recently by Thilmany Pulp & Paper Co., Kaukauna, Wis. Preliminary work on several of the projects was begun during the recent vacation shutdown period, but formal announcement of the program was withheld pending final approval of orders for new equipment and financing arrangements.

New Beloit paper machine

The major project in the program is the purchase of a new paper machine for the manufacture of glassine papers, at an estimated cost of a million dollars. The new machine, ordered from the Beloit Iron Works, Beloit, Wis., will be capable of producing two-thirds more glassine than the combined production of the company's present No. 1 and No. 2 machines, which it will replace. Both the present machines have been in operation for approximately 60 years. Installation of the new equipment will require the expansion of the existing building which houses No. 9 paper machine by an additional 40 feet in length. The new unit will have a 137 inch x 100 foot wire section and greater drying capacity than any of the firm's present units.

Complete rebuilding of No. 7 paper machine is the initial step in the maintenance program. Dismantling was accomplished during the July 4 holiday period, and the improved machine is expected to resume operation within a few days. Included in the rebuilt machine are new fourdrinier and press sections, pre-dryers and additional refining and cleaning equipment. A new save-all also was installed as an operating economy and as another step to comply with the state code on river pollution. This final save-all installation completes a program begun a few years ago to provide each of the company's kraft paper machines with similar equipment at a cost of about $250,000. The rebuilt machine will be capable of producing better grades of paper than at any time since it was originally built. A 40 x 60 foot addition of brick construction will be erected adjacent to the present machine room for paper storage and new concrete loading platforms will be provided.

Railroad sidings in the company's wood storage yard have been relocated to provide space for a proposed auxiliary power plant. A new 40 x 146 foot brick and steel structure, adjacent to the present boiler house at Mill No. 2, will house a new 6000 kw back-pressure, extraction type turbine to meet the expanded power demands. Increased uses of electricity of residential and small industrial customers have reduced the amount of power available to the mill from the Kaukauna utility, making it necessary for the company to increase its own steam generating capacity.

New pulp washing equipment will be provided in compliance with a directive from the company's insurance carriers. Present diffusers have been weakened by long usage to a point where condemnation has been threatened in the near future. More modern methods have been developed for the pulp washing process since the present equipment was installed; the three continuous washing filters will have a capacity of 200 tons per day. Although this is slightly in excess of present requirements, it will provide stand-by capacity during repair and maintenance interruptions. The new pulp washing equipment is also another step in efforts to co-operate with the state stream pollution program, according to company officials.

Fifth project in the modernization program is the complete rebuilding of the wood room, and the installation of a hot pond for pre-treatment of pulpwood. Although this portion of company facilities has not been improved since 1928, the pulp mill capacity has been stepped up 50 per cent since then. More efficient operation of this department will result from installation of a new 12 x 45 foot barking drum, a new 88 inch chipper and two new chip screens, as well as changes in wood procurement. The hot pond, which is in effect a large concrete tank, will be constructed just west of the present wood room. It will be approximately 50 x 300 feet in area and eight feet deep, with reinforced concrete walls. Circulating pumps will control the flow of pulpwood to the jackladders and 70 degree water will be supplied from the recovery plant, with auxiliary steam connections for emergency use.

Digesters, used in the pulp cooking process, are being relined in compliance with insurance regulations. Stepped up production and seven day per week operation have accelerated corrosion to the point where the relining job became imperative.

Converting operations

Proposed retirement of the company's two existing obsolete glassine machines means that all of Mill No. 1 will be devoted to converting operations. These departments, too, are under consideration in Thilmany's full program. Printing production and quality will be improved with the addition of a new four color aniline printing press late this fall. Complete renovation of the decorating department is currently under way and the improved ink mixing and storage room will soon be completed. A new embossing machine is also on order.

Wax department improvements will include the purchase of a new wax laminator and probable removal to the site of the present glassine machines which are scheduled for removal. New machinery is also on order to be used in manufacturing an entirely new paper product, the exact nature of which has not been disclosed by Thilmany.

Necessary piping and pumping systems at both mills, to divert sewage into the city sewer system, are nearing completion. This is another phase in the pollution abatement program.

Cost comparisons have been disclosed which indicate that present maintenance and repair costs amount to approximately $1500 per working day at Thilmany. In the industry as a whole labor costs have increased 150 per cent—from 50c an hour in 1939 to $1.25 per hour in 1950—and investments, industry-wide, have jumped from $17,000 to $24,700 per employee in the same period.

This is an increase of 45 per cent, according to figures published by the American Pulp and Paper Association.

New Steam Plant for APW

A contract has been given to Cassidy and Gallagher, Albany, N.Y., contractors, for the construction of an $80,000 steam generating plant to be constructed for APW Products Co., Albany. The plant, a brick, concrete and steel building about 84 x 54 feet, will be built to the northeast of the APW plant.

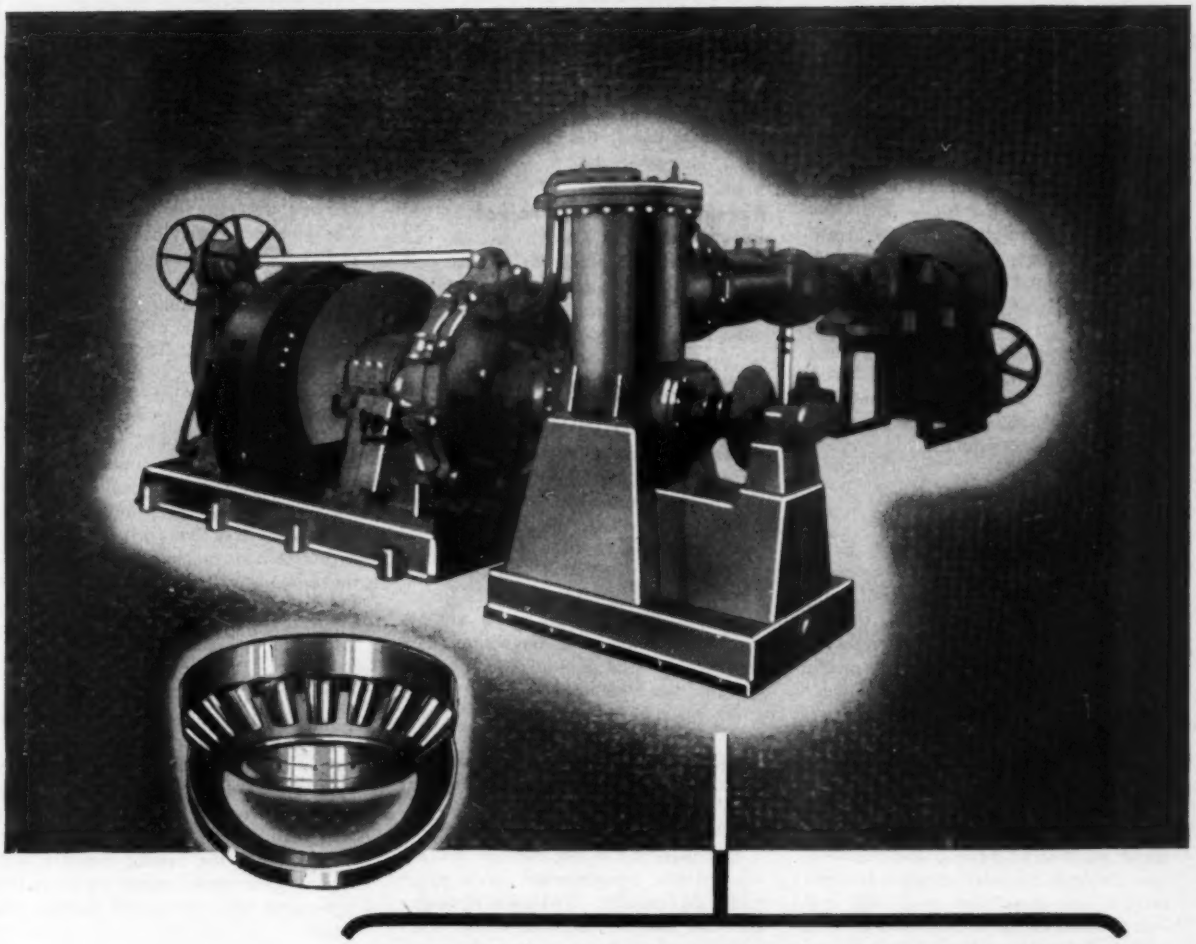
The new steam plant will operate the firm's papermaking machines as well as supply heat for the APW plant, replacing the former system of buying steam from the Niagara-Mohawk Power Corp.

Approval Given for Three South American Projects

Information has been received from Buenos Aires, Argentina, to the effect that the Argentine Government has given first mention to Fibrocel Argentina S. A. in its approval of three mill projects which will inaugurate the new national newsprint industry.

The new plant of Fibrocel, Argentina, S.A., will be built in the principal sugar producing zone of Argentina inasmuch as the major raw material to be employed will be bagasse, the waste of sugar cane. The project also calls for a pulp mill in the wheat growing area most adjacent. Several sites in the center of such areas are being considered. Transport facilities will be the deciding factor. The straw pulp will be shipped in wet-lap form to the main paper mill.

The Noble & Wood Machine Co. of Hoosick Falls, N.Y., will provide all pulp preparation equipment for the new Argentine mill. The Sandy Hill Iron &



FOR FINER FIBRES WITH MINIMUM FINES – IT'S THE ASPLUND DEFIBRATOR

Manufacturers of wallboard, roofing felts and many of the new fibrous products want pulp that's well disintegrated. Fibres should be of original length with a minimum of bundles and fines. They find their answer in the Asplund Defibrator which yields up to 96%, produces fibres from chips in one continuous operation.

The Defibrator operates at temperatures above 212° under steam pressure of 150 to 170 psi, *and is equipped with* SKF *Spherical Roller Thrust Bearings.*

Like all SKF Bearings, they are engineered and made to give maximum service with minimum attention and maintenance.

Manufacturers of every type of equipment for the pulp and paper industry have come to rely on SKF for the right bearing in the right place. SKF Engineers will help you design and build for greater efficiency and productivity. **SKF** INDUSTRIES, INC., PHILADELPHIA 32, PA.,—*the Pioneers of the Deep Groove Ball Bearing, Spherical Roller Bearing, Self-Aligning Ball Bearing.* 7126

SKF
BALL AND ROLLER BEARINGS

Brass Works, Hudson Falls, N.Y., has presented estimates for the papermaking machinery. The technical administration and the production of the new enterprise will be given to American direction.

The Argentine mill will be the first project of size in the world to produce newsprint from the fibers of annual growths. The project stems from the original Presidential Decree of April, 1949, requesting proposals for the erection of newsprint mills in Argentina. The Fibrocel mill will be the first of a series of mills to be erected by The Kinsley Chemical Co., Cleveland, Ohio, in the future. The new mill, which will use the Kinsley processes and techniques, will have a minimum production of 30,000 tons of paper annually.

Solid Wall at Manistique Replaces Window Expanse

One of the greatest improvements made this year at Manistique Pulp and Paper Co., Manistique, Mich., the replacement of the west wall by solid masonry, has been completed. Formerly, the west wall was an almost solid expanse of windows; now, the only windows in the slag rock construction are near the wet end of the paper machine.

The new wall, 450 feet long and 40 feet high, rests on a concrete footing and is reinforced in every direction to withstand machinery vibration and temperature changes; unusual strength features include criss-cross steel grids laid into every second course of blocks to provide both horizontal and lateral strength, as well as reinforced rods set upright in concrete with which the pilasters are filled.

Newsprint Mill Announced for British Columbia

A new Canadian project has just been announced by Canadian Western Lumber Co., Ltd. and Pacific Mills Ltd. These companies will be joint owners of a new newsprint mill to be constructed at Duncan Bay on the east coast of Vancouver Island 100 miles northwest of Vancouver, B.C. This will be the first newsprint mill to be built in British Columbia since 1912.

The two owner companies have formed a provincial corporation to be known as The Elk Falls Co. Ltd., which company will operate the new mill.

First planned unit of the new company will be a newsprint mill designed to produce from 75,000 to 100,000 tons annually. The mill will secure water and power requirements from the John Hart Development of the British Columbia Power Commission at Campbell River about 3½ miles from the mill site.

It is expected that the entire project when completed will involve an investment of $35,000,000 to $40,000,000. The initial unit will provide work for 500 employees and will require approximately two years to build. There will, however, be no company town as in most other British Columbia mills.

Ketchikan Alaskan Project Extended for a Year

Deferment of plans for construction of a multi-million dollar paper industry in the Alaskan forest area has been another development in the twenty-year effort of the Forest Service to establish a pulp and paper industry there. Contracts between the Forest Service and the Ketchikan Pulp & Paper Co. for rights to cut timber on the Pacific coast were drawn up in 1948 and were to be closed this September. Now the contracts have been deferred until August 2, 1951, reportedly to allow the Ketchikan firm to find a successful solution to the waste disposal problem.

Experiments have been under way for the development of a magnesium base process of waste disposal which would prevent the contamination of Pacific coast waters and impairment of the fishing industry. The commercial development of this process, successful on a laboratory basis, is still under study at the Weyerhaeuser plant at Longview, Wash.

Although the Forest Service has advocated the establishment of a paper and pulp industry in Alaska to utilize the vast timber resources there, other considerations have prevented established industry companies from risking great fortunes in development of the area; the difference between governmental theory and commercial practicability as understood by the proposed investors leaves the timber unused. One alternative proposal to the problem is to ship pulpwood via water to established Pacific coast mills; Forest Service regulations are said to forbid this.

Columbia Cellulose Co. Mill Will Open Next Year

The new $27,000,000 high alpha-cellulose plant of Columbia Cellulose Co. Ltd., near Prince Rupert, British Columbia, is expected to come into production during the first quarter of 1951. "All of the buildings are now under roof and closed in," Harold Blancke, president of Celanese Corp. of America, the parent organization, has stated, "except where it was necessary to leave walls open for construction purposes. Machinery and equipment of the latest design is rapidly being installed.

"At the moment there is nothing in sight to interfere with the schedule which aims to have all major process equipment installed and ready for operation by the final month of this year. The huge boiler house is sufficiently advanced to assure operation by November, providing heat and power to commence production."

Additionally, work on the dam necessary to operations is started, and about half of the wood-stave pipeline for carrying water to the plant is installed. The pipeline, which has a 48 inch diameter bore, runs through three mountains more than a mile in length, for a total of six and a half miles from lake to plant.

NEGOTIATIONS FOR SALE OF the Twin Falls Paper Co. and the Frontenac Hydro-Electric Co., Inc., both of Dexter, N.Y., are practically complete. The purchaser is Abe Cooper, president of Bagley & Sewall Co., Watertown, N.Y. The reported prices are $55,000 for the hydro-electric company and $15,000 for the remains of the recently burned-out Dexter mill, formerly known as the Frontenac Paper Mill. (See P.I., June, 1950)

A NEW AND MODERN CHICAGO plant is scheduled by Sherman Paper Products Corp., Newton Upper Falls, Mass., to be opened this fall. Under the management of Arthur L. Lytle, the new factory will manufacture A, B, and C fluted materials for the baking industry, corrugated greaseproof papers for protective packaging, and corrugated display material.

COMPLETE CONVERSION to oil burners at Bowater's Newfoundland Pulp & Paper Mills, Ltd., Corner Brook, N.F., should be completed by November 15. A number of tanks with 150,000 gallon capacity will be erected near the mill site. Company officials expect the switch from coal to oil to reduce costs considerably.

THIRTY-THREE EMPLOYEES of Gould Paper Co., Lyons Falls, N.Y., who have 25 years or more of service with the company were entertained at a company party recently. Highlight of the party was the initiation of eight new members into the old-timers' organization, at which time 25-year service awards were presented to the initiates.

AFTER SEVERAL MONTHS OF inactivity, Continental Can Co., New York, has resumed full production on a one-shift basis at its Tonawanda, N.Y., fiber drum plant. About 85 men, under the management of P. E. Kreischer, have returned to work; others will be added if expected demands for Continental's fiber drums, and the general upswing of industrial activity, are realized.

Selling Books in the Streets in Germany in the 16th Century. Illustration from the Bettmann Archive

500 Years of Book Selling

Almost exactly five centuries ago, Johannes Gutenberg perfected his experiments with movable types and printed his first book. Soon after, printing shops were widely established. Starting in Nuremberg in 1470, Antony Koburger set up sixteen shops, publishing books and selling them in the principal cities of Europe. Religious books and pamphlets, often sold on the streets, had a powerful influence during the turbulent years of the Reformation.

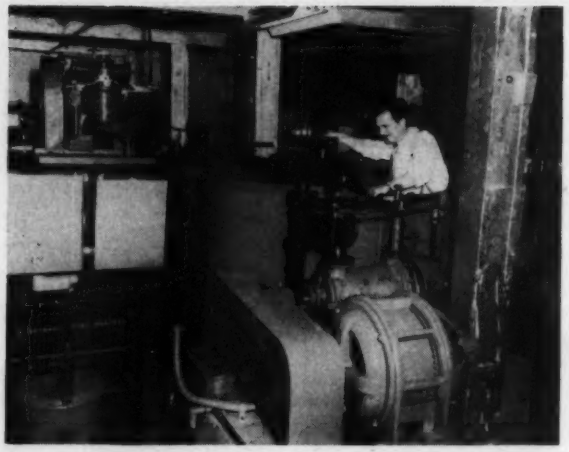
But it was not until cheap paper and the modern printing press made low-cost printing possible that book publishing rose to vast dimensions. Today in the United States alone 500 million books are published annually for distribution through retailers and by mail. Thus, book publishing and book selling have advanced education, culture, and entertainment, and have contributed substantially to the growth of the pulp and paper industry.

The dramatic story of paper is told in the sound-and-color film, "Paper — Pacemaker of Progress," and in a book under the same title. Both are presented by F. C. Huyck & Sons as a tribute to the Paper Industry. The book will be sent free upon request.

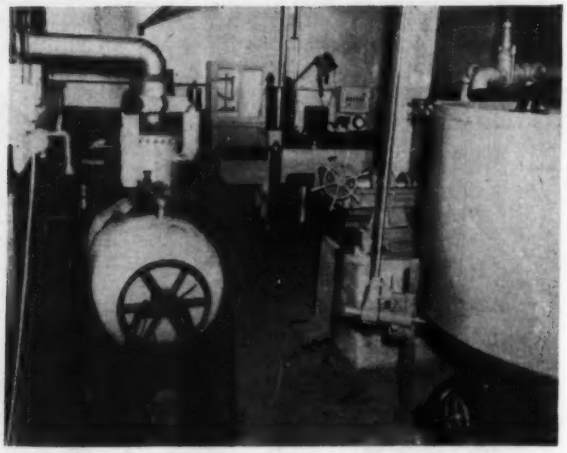
F. C. HUYCK & SONS • *Kenwood Mills* • RENSSELAER, N. Y.

KENWOOD WOOL PRODUCTS

HUYCK *Felts*



Noble & Wood refiner (right), storage tanks and cycle beater (left-back). E. R. Timlowski, Kinsley V.P.



Rotary cooker (left), and storage tanks (right) in Kinsley laboratory

Kinsley Chemical Co. Inaugurates New Pilot Plant and Laboratory

With the addition of a new pilot plant and laboratory, the Kinsley Chemical Co., Cleveland, looks toward an expansion of its operations in the development of papermaking fibers from crop residues and other wastes.

Built and installed by the Noble & Wood Machine Co., Hoosick Falls, N.Y., the equipment has been designed to handle the material being processed in sufficient volume to maintain a close check on results and to permit accurate duplication of results.

The principal refining equipment, which was especially designed for this work, is of a size suitable for small commercial operation and does not require a correction factor to correlate laboratory findings to expected commercial operation.

Coincidentally with the inauguration of the new pilot plant operation, Frank Hayes, head of the sales department of The Noble & Wood Machine Co., was elected a member of the Kinsley company board of directors and also was made vice president in charge of engineering and procurement. It is understood, however, that Mr. Hayes' association with Kinsley does not in any way change his established connection with Noble & Wood.

In a description of the laboratory received from Mr. Hayes, he states: "The equipment in general consists of a rotary cooker of ample capacity for semi-commercial pilot operation, a breaker or slushing beater (which is also adaptable for precision beating), two properly designed storage tanks, a specitl refiner, featuring hydraulic shear rather than mechanical treatment, and driven by a 50 hp. variable speed motor. A series washer-thickener is installed above the tanks, into which it discharges by gravity and a commercial size Dirtec is installed in the stock line between the pump and the washer."

The stock pump is located in a pit beneath the tanks and each of the tanks is piped to the pump suction, with an adequate valving arrangement to permit interchange from one tank to another.

The refiner discharge may be directed to either tank or to the washer-thickener.

Facilities are available for semibleach or full bleach, with adequate arrangement for before bleach thickening and after bleach wash and concentration.

A laboratory screen is installed in conjunction with a Noble & Wood sheet machine and hand sheets of the prepared pulp will clearly indicate the formative qualities of the pulp in any commercial sheet weight or quality. The usual sheet testing equipment is available.

Warren Steam Pump Co. Acquires Quimby Pump Div.

Negotiations have been concluded for the purchase of Quimby Pump Division of H. K. Porter Co., Inc., Pittsburgh, by Warren Steam Pump Co., Inc., Warren, Mass. Formal papers are now being processed by the counsels of both firms.

The acquisition includes inventory, patterns, and good will. All manufacture will now be transferred to the Warren plant, where repair and spare parts service will be set up to accommodate present and future users of Quimby pumps.

Key men formerly associated with Quimby have been employed by Warren to supervise production and application of the Quimby screw and rotary pumps which are new items to the Warren line.

National Lead Expanding Titanium Production

Construction of new facilities for the production of titanium pigments began last month at the St. Louis plant of National Lead Co., New York. The additional capacity is expected to increase the present rate of production of the pigments from 60,000 to 70,000 tons annually.

The expansion, needed to supply the steadily increasing use of titanium pigments, should be completed within a year if equipment is delivered promptly; full production is expected within eighteen months.

Harnischfeger Completes Escanaba Plant Addition

Construction of a three-bay addition to the Harnischfeger Corp. truck crane plant at Escanaba, Mich., has been completed on schedule by the Austin Co., Cleveland construction firm. Machinery and materials are now being moved into the new section, which will house the company's welder shop, storeroom, and steel storage department.

The Harnischfeger firm has also established its D-C welder plant in Escanaba in a site previously occupied by a furniture company.

Infilco Moves General Offices and Some Dept. to Arizona

The relocation of Research, Development and Engineering Divisions and General Offices of Infilco, Inc., formerly headquartered in Chicago, at Tucson, Ariz., was accomplished September 1. Temporary quarters at 2750 So. Twelfth Ave., Tucson, are being utilized while a new building is being constructed.

Manufacturing, chemical laboratories, advertising and some engineering work will continue in the Chicago plant at

SERVING THE PULP AND PAPER INDUSTRIES FOR 25 YEARS

Bauer DISK REFINERS

- FOR FIBERIZING
- DIRT DISPERSAL
- PULPING
- DE-INKING
- STRENGTH DEVELOPMENT

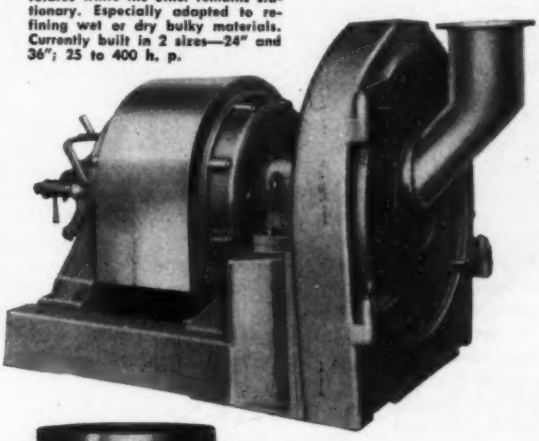
Twenty-five years' experience in scores of pulp and paper mills has conclusively proved that Bauer disk refiners perform operations which cannot be successfully accomplished with other machines.

Many patterns of plates are available for processing chips, screen rejects, waste paper, straw, and other fibrous materials. The operating clearance between plates can readily be adjusted and precisely maintained. The peculiar swirling, centrifugal action of the plates produces outstanding results in reducing, fiberizing, and uniformly dispersing the materials.

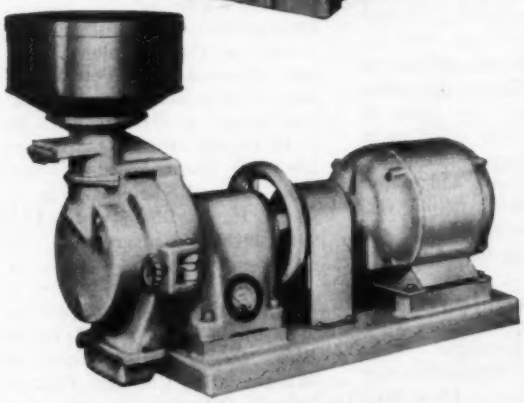
Bauer disk refiners are versatile in performance and serve a variety of purposes in different mills, being placed in the stock preparation system anywhere from preliminary reduction to final refining.

Many details are explained in our Bulletin P-1. You should read it. A copy will be gladly sent upon request.

SINGLE-DISK REFINERS. One disk rotates while the other remains stationary. Especially adapted to refining wet or dry bulky materials. Currently built in 2 sizes—24" and 36"; 25 to 400 h. p.



DOUBLE-DISK REFINERS. Both disks rotate, each driven by an individual motor. Built in 2 sizes—24" and 36"; 50 to 600 h.p.



LABORATORY MILL. Specifically built for test grinds and sample runs. Adapted to reducing wet materials such as samples of semi-cooked chips. Rotating and stationary 8" disks; 3 to 10 h.p.

BAUER-MEAD LABORATORY MILL. Makes complete strength development curves on pulps in a matter of minutes. Gives reproducible results. Ask for special leaflet No. P-6.

THE BAUER BROS. CO.

SPRINGFIELD, OHIO, U.S.A.

Established 1878

MANUFACTURERS OF DISK AND HAMMER MILLS, SHREDDERS, BAUER-McNETT CLASSIFIERS, PERMANENT MAGNETIC SEPARATORS

325 W. 25th Place; space formerly occupied by the newly-relocated departments will be used to enlarge the activities of those departments remaining in Chicago.

Plans are under way to increase the New York and Chicago sales engineering office staffs, as well as to locate field engineers in additional cities to provide for prompt service throughout the country.

V. W. Farris Organizes New Co. —Acquires Edison's Stacon Div.

Formation of a company to purchase, and manufacture in the future, the Edison Stacon Regulating Valve Division from Thomas A. Edison, Inc., has been completed by V. W. Farris, president of Farris Engineering Corp. The new company, to be known as Farris Stacon Co., will be the nucleus of extensive plans to develop industrial instrumentation and temperature control. Numerous improvements in design and construction are being made in the Stacon instrument, although the basic design and construction have been retained.

The newly-formed firm, with headquarters at Palisades Park, N.J., will service all present users of Stacon regulators and controllers, since all patents equipment, machinery, inventory and records were included in the purchase from Edison.

A MODERN SOYBEAN PROCESSING PLANT with a daily capacity of 10,000 bushels will be constructed at Painesville, Ohio, by A. E. Staley Manufacturing Co., Decatur, Ill. All major equipment for the plant has been purchased and a large engineering force has been assigned to the project; actual construction work is expected to begin in January or February, with completion scheduled for the fall of 1951.

CONTRACTS HAVE BEEN LET for the first unit of laboratories to be built in Bainbridge, N.Y., by Foster D. Snell, Inc., New York. Construction of the new units will be of concrete and brick; the first unit, which is a single wing of a structure providing for four wings with extensions, will be occupied by the Supplee division.

CONTRACTS HAVE BEEN AWARDED to H. K. Ferguson Co. by Stauffer Chemical Co. for the construction of a new research laboratory at Dobbs Ferry, N.Y. Construction has already begun on the one story, structural steel frame structure, which will have waterproofed brick veneer walls. Other modern features will include air conditioning and fluorescent lighting fixtures.

One of eight pump test stations in the newly completed hydraulic laboratory at the Indianapolis (Ind.) works of Peerless Pump Division, Food Machinery and Chemical Corp.

Peerless Pump Testing Laboratory at Indianapolis in Operation

Completion of a new pump testing laboratory at the Indianapolis, Ind., works of Peerless Pump Division of the Food Machinery and Chemical Corp., Los Angeles, has been announced. The laboratory occupies over 7000 square feet of floor area and includes a total of eight pump stations. Both high and low voltage equipment is available, using motors up to 1000 hp. in size.

Pumps are tested to obtain their complete performance characteristics, to observe their operation, and to compare results in the laboratory, with calculated and design performance data. This requires measurement of the amount of water or capacity handled by the pump, the head against which the pump is operating, the power input to the pump and the exact speed of operation during measurements of the input and output factors. By conventional hydraulic formulae efficiencies are computed; and results with liquids other than water can be calculated.

One of the outstanding features of the new Peerless hydraulic laboratory is the extremely accurate horizontal cradle mounted dynamometer equipment supplied by General Electric Co. These direct current dynamometers are controlled by amplidynes with electronic pre-amplifiers. The Peerless installation is the first hydraulic pump laboratory in America to use this kind of control. A 10 hp., 25 hp., 75 hp., 200 hp., and 450 hp. dynamometer with operation speeds up to 4500 rpm provide a wide selection of sizes, so that deflection on the Toledo-No-Springs dynamometer scales will give the highest accuracy of readings possible.

It has always been standard practice with Peerless Pump to make complete running tests of all engineered horizontal pumps prior to shipment to insure their accurate and reliable operation in the field. In addition, much testing has been done and will continue to be done in the future in developing new and still better pumping equipment for Peerless customers.

TWO DISTRICT OFFICES of Jeffrey Manufacturing Co., Columbus, Ohio, have been relocated. The West Virginia office, formerly situated at Huntington, is now located at 403 City Ave., Beckley; E. H. Hebden remains as manager. The Cleveland district office, previously located in the Rockefeller Bldg., is now in the Hanna Bldg., where J. W. St. John serves as manager.

A NEW DISTRICT SALES OFFICE has been established at 426 Transportation Bldg., Cincinnati, by Graver Tank & Manufacturing Co., East Chicago, Ind. John R. O'Connor, formerly a member of the East Chicago headquarters staff, has been made manager of the new district office.

ONE OF THE FIRST manufacturers in this country to make hydrogen peroxide electrolytically, Buffalo Electro-Chemical Co., Inc., Buffalo, N.Y., is celebrating

At Green Bay . . .
Another Bagley & Sewall Machine

This Bagley and Sewall Fourdrinier Machine is making corrugating and liner board in the Green Bay Paper and Pulp Company, Green Bay, Wisconsin.

It has the Quick Wire Changing type of Fourdrinier that makes possible the changing of the wire without the usual removal of rolls and other equipment. The wire is 100 feet long by 174 inches wide. Another Bagley and Sewall Paper Machine that is doing an outstanding job.

When planning on new paper machines or equipment, write us. We'll be glad to give you the benefit of our eighty years' experience in paper machinery manufacture.

BAGLEY & SEWALL

DESIGNERS AND BUILDERS OF PAPER MAKING MACHINERY

WATERTOWN, NEW YORK

Finland Representative
Aktiebolaget Ekstroms Maskinaffar
Helsingfors, Finland

New York Office: 500 Fifth Avenue, New York, N. Y.

Foreign Representative
Castle and Overton, Inc.
630 Fifth Ave., Rockefeller Center, New York, N

Fig. 3169 single stage, open impeller centrifugal

7 more sizes in this new Centrifugal Line

This new and extremely successful line of centrifugals is now available in 10 sizes. You can now take advantage of the efficiency of this new design to fill your pumping needs in a wide variety of applications.

APPLICATIONS

Goulds designed the Fig. 3169 especially for general water service, irrigation, Slurries, circulation, transfer and factory wastes. It also gives excellent service in air conditioning, plumbing, heating, processing and related applications.

ADVANTAGES

The most important advantage of these pumps is their efficient, modern design. Simple construction, light weight and compact size give you reasonable price and unusually good service over a long period of time.

CAPACITIES

Fig. 3169 is made in 10 sizes for both motor and belt drives. Capacities to 1000 G.P.M. with heads to 180 ft., depending on capacity.

For more information call or write Pump Headquarters or your nearest Goulds dealer. Ask for Bulletin 720.4.

MEMBER

Goulds PUMPS INC. Seneca Falls New York

its twenty-fifth anniversary this year. C. A. Buerk, who founded the firm in 1925, is still serving as president. In its first quarter century the company has seen many technical advances and improvements in using and handling hydrogen peroxide; where originally hydrogen peroxide was the company's only product, today eleven peroxygen compounds are manufactured.

AN OFFICE has been opened by Frederick Wierk, consulting engineer, at 220 East 42nd St., New York 17, N.Y. The telephone number is MUrray Hill 2-8598-9.

A NEW MOVIE AVAILABLE on a loan basis from Clark Equipment Co., Industrial Truck Division, Battle Creek, Mich., "Handling Rolls with the Bartel Device," shows in action on marine and rail terminal receiving platforms in warehouses the use of the device for fast, safe handling of huge rolls of newsprint and other cylindrical items with hollow cores. The movie runs 12 minutes and is offered on black and white 16 mm. film with sound.

THE ION EXCHANGE business of American Cyanamid Co., as well as the trademark "Ionac" has been acquired by Permutit Co., New York. The newly-purchased materials will be manufactured and distributed by Permutit's subsidiary, American Zeolite Corp.

LARGE SCALE PRODUCTION of gas turbines, the latest type of power plants for land, rail, and marine use, has been started by the General Electric Co. in its Schenectady, N.Y., headquarters. Facilities for the new production are being installed at a cost of more than $4,000,000. Thus far, three G-E manufactured gas turbine power plants are in operation.

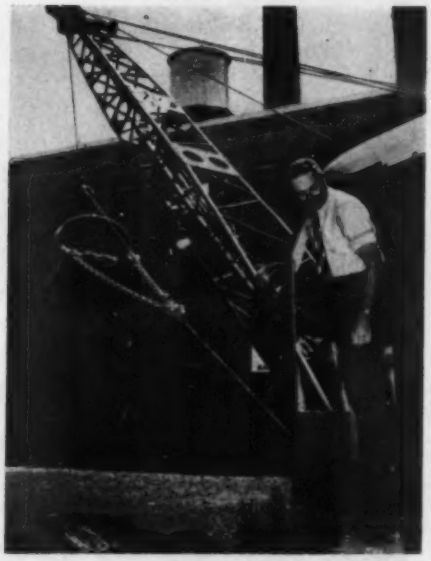
A STOCKHOLDER'S VOTE HAS resulted in National Battery Co., Trenton, N.J., changing the company's name to Gould-National Batteries, Inc., upon the purchase of the Gould Storage Battery Co. Policies, management and operation of Gould-National will remain the same as those followed heretofore by Gould and by National.

LOS ANGELES OFFICES of Hagen Corp., Pittsburgh, and subsidiaries—Calgon, Inc., Hall Laboratories, Inc., and The Buromin Co.—have been moved from 1807 East Olympic Blvd., Los Angeles, to 3931 Tweedy Blvd., So. Gate, Cal.

The Paper Industry Pictured Highlights

BACK IN SERVICE

Prominent in government activities during World War II, George H. Mead has been named a member of NSRB Committee on Mobilization. (See Current Comment)



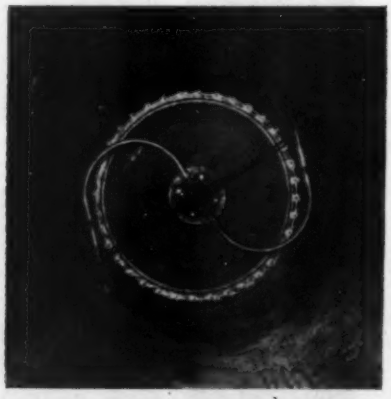
FIRST SHOVELFUL

M. D. Bardeen, Lee Paper Co. president (Vicksburg, Mich.), grins acknowledgment for applause as he breaks ground for addition to company plant which will house 3rd paper machine.

ONLY FOUR STRIPS OF TAPE support the weight of these two young people. Fiberglas-reinforced pressure sensitive tape has strength of 500 lb. per inch.

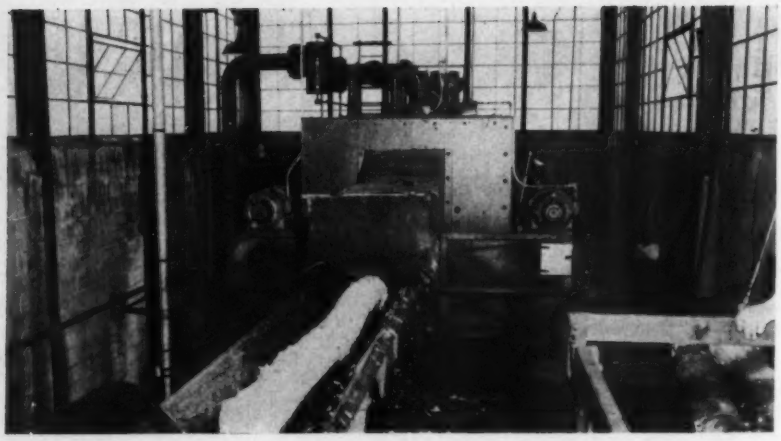
SAFETY RECORD

Sutherland Paper Co wins safety plaque. L to R—Harry Webber, safety dir., Mac-Sim-Bar Paper Co.; Lester Kinney, sec. Kalamazoo Industrial Safety Club, donor; Wm. Race, Sutherland president; Donald Hobart, Safety Services, Inc.; Gordon Moore, Lee Paper Co. & M.C; and Forrest Kimmell, Sutherland safety director. (See Safety News)

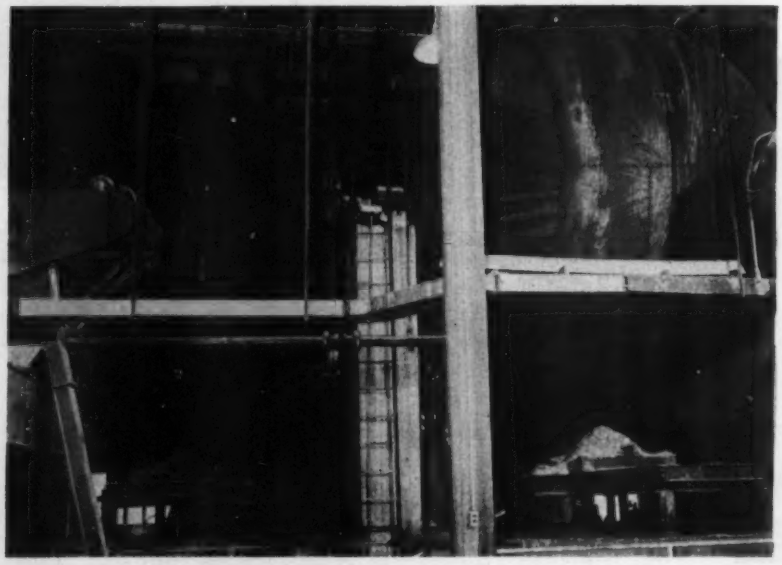


WHAT IS IT? As the dryer turns, the S-shaped pipe scoops up condensate. Yes, it's the inside of a dryer roll.
(Courtesy "The Digester," Union Bag & Paper Corp.)

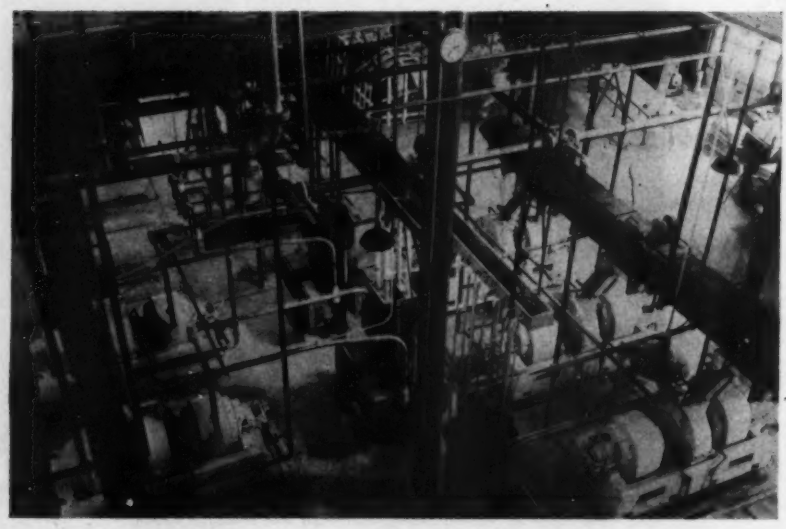
PAPER SHELTERS (built by Thilmany P. & P. Co.) housed Wisconsin's Valley Council Scouts at the National Boy Scout Jamboree, Valley Forge, Pa. Shelters used were made of waterproofed reinforced wet strength paper.
(Courtesy Thilmany Pulp & Paper Co.)



Wood is debarked in an Allis-Chalmers hydraulic barker



Chips are cooked in two Biggs rotary globe digesters



Semichemical cooked chips are defibered in 2 rows of Bauer refiners

Paperboard is made on 174-in wide Bagley & Sewall fourdrinier machine with J. O. Ross Eng. Co. hood

New Green

George Kress
President

George Mackin
General Manager

Lloyd "Curly" Lang
General Supt.

Hu Miller
Pulp Mill Supt.

Earl Barnhart
Engineer

Clyde Faulkender
Consultant

Bay mill makes semichemical paperboard

RICHARD W. PORTER
Editorial Director, The Paper Industry

Green Bay Paper & Pulp Co. employs neutral semichemical sulphite process to cook locally grown poplar . . . attains high pulp yields . . . makes 9 pt. corrugating medium

▶▶▶ WHEN NEW PULP MILLS are built in areas of abundant wood supply, such procedure is not unusual. But when a new mill is built from scratch to depend entirely upon home grown poplar, *that is news*. It's also fairly common for paper and board mills to build plants for converting their paper to finished products, but it's rather unusual for a relatively small boxmaker to integrate operations by building a new pulp and paper mill. But that's what happened in Green Bay, Wis.

In 1948, the Green Bay Paper & Pulp Co. was formed to build a plant for the manufacture of paperboard. A site, about 25 acres in area, was selected on the south bank of the Fox River across town and only a few miles from the Green Bay Box Co., whose president, George Kress, was responsible for organizing the new company. Because of the necessity to get into operation with a minimum investment, the mill was designed for a basic production of 50 tons per day with provision made for readily expanding by installation of additional equipment such as digesters, refiners, and paper machine dryers.

Four buildings, constructed of concrete building block, house the major departments of the mill: boiler plant, wood preparation, pulp mill and paper mill. These are spaced apart so that future additions will be readily possible. Similarly, the present pulp mill structure has space available for installation of more pulping and defibering capacity.

In the paper mill, the 174-inch-wide Bagley & Sewall fourdrinier machine uses all of the present pulp mill output operating at only 350 fpm with only 18 dryers. By extending the dryer section it will be possible to speed up the machine and more than triple papermaking capacity.

The man whose vision and vigor is responsible for this enterprise is George Kress, president of the company. George Mackin, general manager, recently came to Green Bay from the Forest Products Laboratory in Madison. Lloyd "Curly" Lang, who is general superintendent, was responsible for the design and construction of the paper mill. Hu Miller, who supervised the pulp mill and wood mill installation, is pulp mill superintendent. Other key men in the organization are Robert Wilkes, paper mill superintendent; Robert Cormier, wood room foreman; Marvin Peterson, mill engineer; Charles Austin, power plant engineer; William Nelson, technical engineer; and Earl Barnhart, engineer.

Clyde Faulkender, as consultant, prepared the mill layout and designed the pulp processing system. Orbison & Orbison and Central States Engineering, Inc., both of Appleton, assisted in the design of the paper mill. Building construction was handled by Baker Construction Co.; piping contractor was George F. Reeke Co., and electrical installations were made by Beemster Electric Co.—all of Green Bay.

Wood supply

Most of the wood is obtained within about a 50- to 75-mile radius of Green Bay. About 60 per cent of the wood is brought to the mill by railroad cars and the remainder is received by truck. Unpeeled poplar logs, 100 inches long, 4 to 10 inches in diameter, are used by the mill although other woods such as tamarack and jack pine have been tried experimentally. Wood is unloaded from cars by a Lima crawler-type crane with a 50-foot boom and a ¾-yard grab bucket, and is dropped in the log pond or is piled in the woodyard. About 10,000 cords may be stored in the yard.

A three-strand Murray jack ladder delivers wood from the log pond to the feed-conveyor leading to the Allis-Chalmers hydraulic barker. Debarked logs from the Streambarker are discharged to a conveyor which feeds the chipper. Link-Belt conveyor equipment is used in the wood room.

High pressure water at 850 psi is supplied to the barker nozzles by a 200 psi single-stage booster pump and a 650 psi four-stage pump, both Allis-Chalmers. Underneath the discharge end of the

Streambarker is an A-C 3 x 12 ft. low-head vibrating screen that dewaters the bark. The bark drops to a lateral inclined conveyor which passes through the outside wall and discharges to a truck. All bark and wood waste is dumped in the adjoining swamp. Since the ground is all rather low in this locality, there is plenty of fill area for receiving this material.

Debarked wood goes into a Carthage 10-knife, 64 inch diameter chipper driven by an Allis-Chalmers 150 hp. motor with a flat belt drive. Chips are not screened, but discharge direct to a Stephens-Adamson 13-inch Z-shaped Redler conveyor-elevator-conveyor to the top of the two storage silos. The two steel chip silos hold about 35 cords each, and are 20 feet in diameter by about 40 feet high. They have cone-shaped bottoms equipped with Syntron vibrators to aid the free flow of chips to the Stephens-Adamson 60-inch bin discharger units with revolving arch breakers. These drop the chips into a Redler conveyor system that delivers them to the digesters. The silos were built by Northeastern Boiler and Welding Ltd., Green Bay.

Water

Water for the pulp mill is taken from the Fox River. It flows through a culvert into a well nearly 500 feet from the river. Water is then pumped from this well by a 2500 gpm Peerless mixed flow pump to a North Rotary screen built by the Green Bay Foundry and Machine Works to remove any debris or foreign matter in the water. A Goulds fresh water pump delivers water from the screen at 45 psi to the pulp mill and to the hydraulic barker pumps. White water from the paper mill is returned to the brownstock washer in the pulp mill.

Steam and power

All electric energy is purchased and is stepped down from 13,000 volts to 440 in a substation supplied by the utility company. Steam, however, is generated in a boiler plant designed by W. I. Barrows, consulting engineer of Dayton, Ohio. The two identical Babcock & Wilcox 500 hp. Stirling type boilers each have a capacity of 35,000 lb. of steam per hour, operating at a maximum pressure of 200 psi. The broilers are equipped with Diamond soot blowers and a Bailey Instrument Co. control panel.

Feed water is treated by an Allis-Chalmers hot process softening system. One of the Goulds feedwater pumps is driven by a G-E steam turbine and the other by an electric motor.

Riley spreader type stokers are equipped with hoppers that are loaded by means of a Case tractor equipped with a Lull Mfg. Co. shovel loader which brings the coal in as needed from the outdoor storage. About 70 tons per day of "Pocahontas screenings" coal are consumed by the two boilers.

Neutral sulphite

Cooking liquor is made up of technical grade sodium sulphite and soda ash. The dry chemicals are mixed with water in a dissolving vat sunk into the floor, and then pumped into the liquor storage tank by a 500 gpm Goulds pump. This same pump is hooked up to pump the liquor from storage to the digesters. The liquor storage tank is equipped with a Foxboro liquid level recorder located on the digester operating floor. Liquor charged to the digester is measured by the level in the storage tank. The storage tank was built by C. Henneke Structural Steel Co., Milwaukee; it is equipped with a Mixing Equipment Co. side-entering agitator.

Semichemical cooking

Each of the two 16-ft. diameter rotary globe digesters built by the Biggs Boiler Co. can be operated at pressures up to 150 psi and are rotated at ¼ rpm by totally-enclosed, fan-cooled Allis-Chalmers motors and gear reducers. Chips are loaded and discharged through a manhole. The hollow trunnions on the digesters are piped through a Chicksan rotary joint to the liquor tank, steam header and blow tank. The main valve on each digester is a manually-operated Yarway seatless valve, and De Zurik valves are installed on the lines to the liquor tank and blow tank.

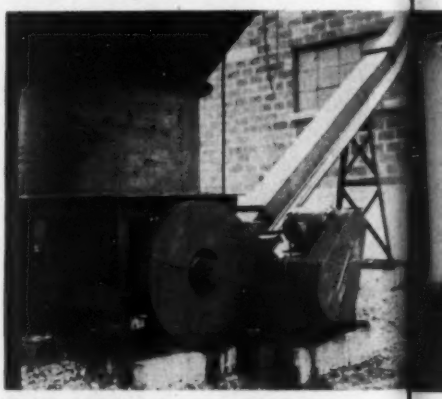
All valves are equipped with extension "lazy jack" handles so they may be manually operated from the digester floor. The Redler conveyor to the digesters, chip silo discharge units and Syntron vibrators are also controlled by pushbuttons from the digester operating floor. A single chip chute under the Redler conveyor may be moved to either digester for loading. Each digester holds about 10½ cords of wood and yields about 8 tons of semichemical pulp.

Neutral sulphite semichemical cooking is carried out by impregnation of chips with liquor and removal of excess liquor prior to cooking, as developed by the Forest Products Laboratory, Madison, Wis.

A single vent-tank serves both digesters. It consists of a tank car to which an extension stack has been added. About 800 gal. of condensate per cook is col-

Wood is unloaded with Lima crane; Murray jack ladder removes wood from pond

Two Allis-Chalmers multistage pumps supply 850 psi water to hydraulic barker



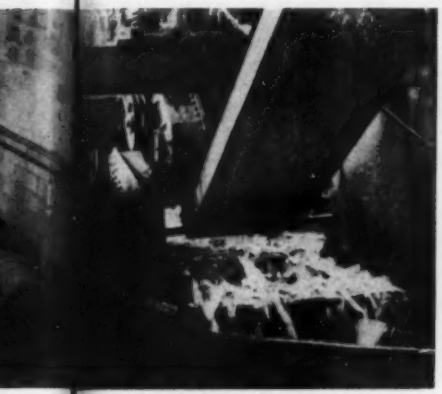
Stephens-Adamson bin discharge unit feeds chips to the digester conveyor

Leach caster mechanism driven by Sterling gear-head motor

North rotary filter delivers fresh water to Goulds mill supply pump

Coal is charged to boiler by means of a Case tractor with a Lull shovel loader

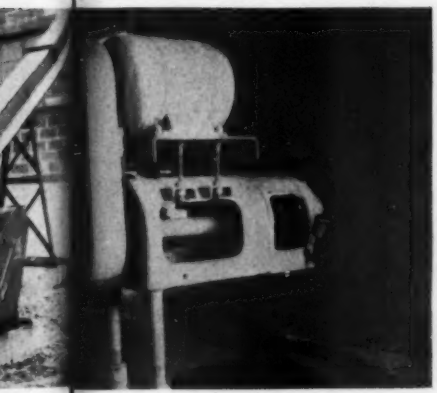
Two B&W boilers with Riley stokers provide 200 psi steam



A-C Screen dewaters bark and discharges to Link-Belt conveyor

Debarked wood goes through 10-knife Carthage chipper with flat belt drive

Redler conveyors transfer chips to and from storage silos



Neutral sulphite liquor tank with a "Lightnin" side entering agitator

Digester vent-tank is a converted tank car

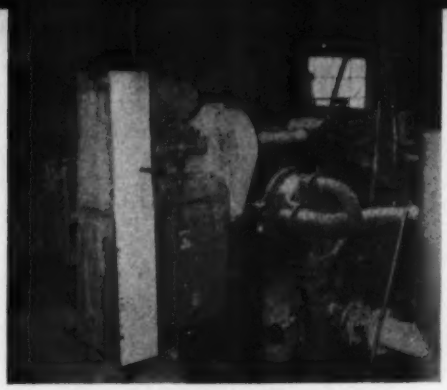
Semichemical chips are discharged from digester to leach caster

L-B screw conveyor delivers chips from leach caster to the Redler elevators

Bauer refiners defiber cooked chips; magnet on feed chute removes tramp iron

DeZurik pressure-type consistency regulators in the two pulp lines

Two Fischer & Porter stock meters proportion stock from pulp lines

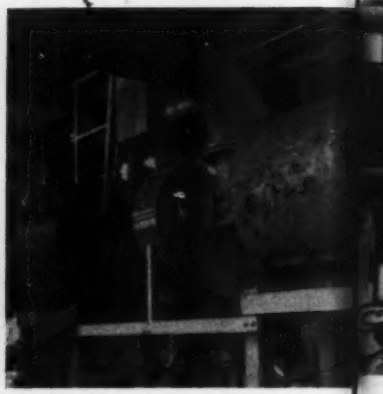


Impco brown stock vacuum washer can be operated as one or two stage unit

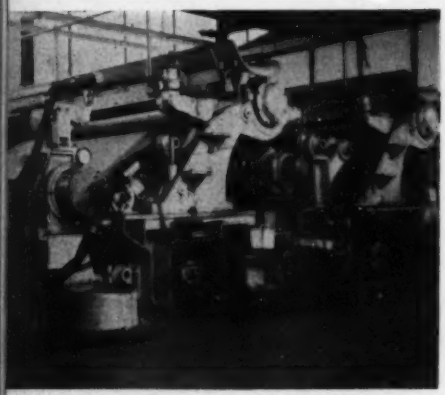
Stebbins-tile machine chest with Foxboro level recorder

Stock passes from machine chest through Claflin refiner

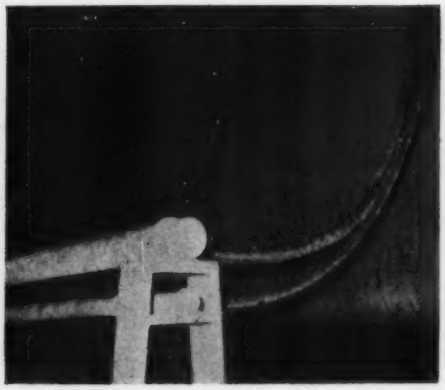
Consistency of refined stock is regulated by DeZurik open type regulator



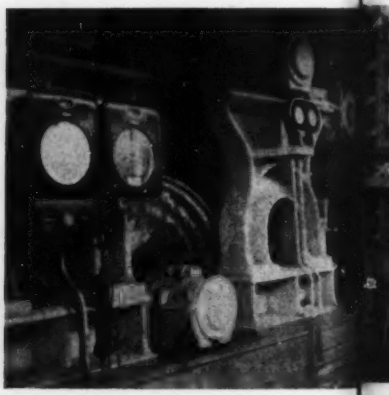
Two parallel Trimbey centrifugal screens deliver stock to fan pumps



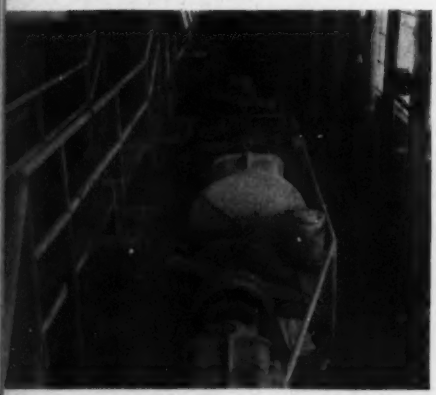
Two plain presses with Stonite top rolls and rubber-covered bottom rolls



Each press felt is cleaned with Vickery felt conditioners



Foxboro controls on dryers; Midwest-Fulton system handles condensate

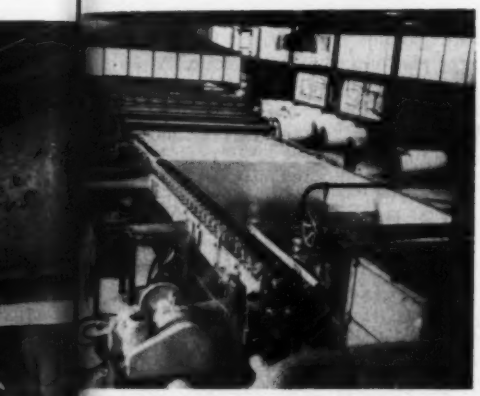


Bagley & Sewall mechanical drive; Fawick clutch, A-C V-belt unit

Yale & Towne 5-ton monorail hoist transfers reels to the winder

Nine-point board is rewound into rolls on rebuilt Pusey & Jones winder

Robert Wilkes, paper mill supt.; Curly Lang, gen. supt.; and Allan Hyer, Bagley & Sewall



Bagley & Sewall fourdrinier with cantilever type wire changing arrangement

Calender stack with Vickery doctors and a uniform speed type reel

Clark lift-truck takes rolls to Toledo scale for weighing

lected in the blow tank. This is discharged to the log pond for heating purposes.

Leach casters

The concrete dump tanks under each digester holds two cooks. Each is equipped with a leach caster supplied by Associated Patents, Inc., Knoxville, Tenn., for discharging chips at a uniform rate to a Link-Belt screw conveyor at the bottom of the tank. The leach caster is a horizontal rotating paddle with blades or sweeps arranged to level off the surface and to provide constant feed to the discharge screw. The rotating unit is driven by a vertical shaft and is supported by cables from the top, which are attached to a ratchet feed mechanism to regulate the rate of lowering the rotating sweeps. Leach caster sweeps, feed mechanisms and discharge screw conveyors are each driven by individual Sterling gear-head motors.

Defibering semichemical chips

A separate conveyor system each feeding a line of Bauer refiners receives chips from each of the two leach caster tanks. Each screw conveyor discharges cooked chips to the boots of two 9-inch Redler loop-boot elevators. Each of these discharges to an overhead horizontal 11-inch Redler. Excess chips not taken by the Bauers are sent back in the return part of the conveyor to the leach caster tanks.

Chips drop by gravity from the conveyor to the variable speed screw that feeds each Bauer. Each feed chute is equipped with a Bauer Magnetic trap (using a permanent magnet) for removing any tramp iron before the chips go into the disk mill. Water is added to the moist semichemical chips by two showers in the feed chute which control the consistency between the fiberizing plates.

Showers outside the disks are used for dilution of the resulting pulp.

The 36-inch diameter double disk Bauer refiners operate at 1200 rpm with each disk driven by a Westinghouse 150 hp. induction motor. Five such units are employed and are arranged in two lines —one line with three Bauers and the other with two units. A horizontal Link-Belt screw conveyor driven by a Sterling gear-head motor under each line of Bauers receives the defibered stock and conveys it direct to individual stock chests equipped with Shartle propeller type top-entering vertical agitators driven through Falk gear reducers. Each stock chest holds 1½ tons of pulp.

Washing

From the chests the stock is pumped with Shartle pumps through pressure type De Zurik torque-operated consistency regulators and then to Fischer and Porter stock meters before going to the Impco brown stock washer. A total of about 3 tons of pulp per hour is metered to the washer.

The Improved Paper Machinery Corp. brown stock washer is operated in a single-stage although it is valved for 3-stage washing. Vacuum is provided by a Nash pump through a separator tank. The separator tank is equipped with a Foxboro differential pressure type liquid level controller, which operates a Belfield butterfly valve on the discharge side of the Peerless pump that empties the tank. Water from the separator tank may be recirculated as dilution water back to the washer or may be discharged to the river.

Washed stock is repulped to about 4 per cent consistency and flows to a small surge chest from which it is pumped with an Allis-Chalmers stock pump to the machine chest in the paper mill. White water from the paper mill furnishes a considerable part of the water used for washing and repulping.

Versatility in pulping operations is achieved in that the pulp mill is laid out as two separate pulping systems. From chip silos through the stock meters it is possible to process two entirely separate kinds of pulp using different kinds of wood, different cooking procedures, different refiner settings and, at the end, blending in any proportion desirable by means of the stock meters.

Future expansion is provided for with space being allotted for two more digesters and leach caster tanks and with space available for additional defibering units. Furthermore, about 100 feet separates the present pulp mill building from the paper machine room so that space will be available for any future needs. Similarly, the boiler plant and wood mill are in separate buildings and are located some distance from each other and from the pulp mill and paper mill.

Paper mill

Washed stock from the pulp mill is pumped direct to the Stebbins built tile machine chest equipped with an Impco top-entering agitator. The 16 foot diameter by 20 foot deep chest holds about 4 tons of stock and is equipped with a Foxboro liquid level recorder.

Final treatment is given the stock by a No. 2 Claflin refiner driven by a 225-

hp. synchronous motor. The stock then goes to a De Zurik open type consistency regulator from which it flows to the paper machine fan pump. The Goulds fan pump (4200 gpm, 26 foot head) sends the stock to two parallel Trimbey screens driven by Allis-Chalmers motors and V-belt drives, which discharge direct to the paper machine headbox.

Bagley & Sewall paper machine

Bagley & Sewall supplied the complete fourdrinier paper machine. While it is now operating at about 350 fpm, the machine, except for drying capacity, was designed for an ultimate speed of about 1000 fpm. According to present plans the machine will be speeded up by installation of additional dryer sections. The paper machine uses all the stock produced by the pulp mill, but when pulp production is increased, drying capacity of the machine will be expanded.

Wet end

Head box and slice are of standard construction. The fourdrinier wire is 174 inches wide by 100 feet long, and from the breast roll to the couch roll, runs over 28 table rolls and 5 flat suction boxes. All rolls are brass and are mounted in antifriction bearings. The fourdrinier is equipped with V-belt driven single shake unit, a 32-inch diameter Beloit built suction couch and a Stowe-Woodward rubber covered lump breaker roll. Two Nash vacuum pumps are employed—one for the suction couch and one for the flat boxes.

Wires are readily changed because the cantilever arrangement permits all supports to be removed on the front side so that the wire can be slipped over the whole assembly. The fourdrinier frame carrying the breast roll, table rolls and suction boxes, rolls forward onto special fulcrum supports on the back side of the machine. Then, the three cantilever arms are linked to anchors in the floor, after which the fulcrum is raised with a motor driven jack.

A closed whitewater system is employed with excess being returned to the pulp mill for use in the brown stock washer and repulper. Only about 200 gpm of fresh water is used in the paper mill and this is for three paper machine fresh water showers. Six Peerless sump pumps are used for pumping white water from the chests, etc. All stock pumps in the paper mill are Allis-Chalmers.

Because of the closed white water system, slime troubles are sometimes encountered. National Aluminate Co. mercurials and phenates are used to control slime. When pitch troubles are encountered, Nalco sodium aluminate briquets are added to the whitewater system.

Only a negligible volume of waste effluent is sent from the paper mill to the river. This consists mainly of contaminated condensate, cooling and sealing water. Because the basement level is lower than the river, it is necessary to pump the effluent to the river.

Water is extracted from the web by two plain presses, each made up of two 26-inch diameter rolls. Top rolls are made of Stonite (Stowe-Woodward) and the bottom rolls are rubber covered (Manhattan Rubber Co.). Press rolls are kept clean with Lodding oscillating doctors, and each press is equipped with a wet broke conveyor. Each of the identical 46 foot long press felts are kept clean with individual three-shoe Vickery felt conditioners hooked up to a single Nash vacuum pump. Extraction of water is aided by a flat suction box on the first press felt just ahead of the first press. Presses are weight loaded, but this may be readily changed to operate with pneumatic loading when operating conditions warrant such a change. Gilbert & Nash guides are employed on the fourdrinier wire and press felts.

Dry end

From the presses the sheet goes to the dryers containing two sections of 8 and 10 drying cylinders. The 60-inch diameter open-gear dryers are equipped with Vickery doctors and Sheehan rope carriers.

Exhaust steam from the steam engine drive, controlled from a Foxboro panel, is used in the dryers. Johnson rotary joints, Armstrong steam traps and a Midwest-Fulton drainage and condensate system are used on the dryers. A Chicago Pump Co. pump returns condensate to the boilers. A Bowser lubrication system is being installed.

The dryer section is equipped with a J. O. Ross Engineering Co. Transite constructed hood and ventilating system using two exhaust fans with a combined capacity of 55,000 cfm. A Ross vapor absorption system is being installed to increase drying capacity. The machine is being rigged for bottom dryer canvas, so that maximum drying capacity can be attained. Future plans include the addition of several more dryer sections to take advantage of the machine's ultimate speed and production capacity.

From the spring roll following the last dryer, the sheet passes through a 7 roll motor-lift calendar stack and then to a Pope type reel. All calendar rolls and the reel drum are kept clean with Vickery doctors. Nearly thirty such doctors are employed on the paper machine.

Full reels are transferred to the unwinding stand of the Pusey & Jones winder by a 5-ton Yale & Towne electrically operated monorail hoist. The double drum winder is driven by variable speed Louis Allis motors through adjustable sheave V-belt drives.

Rewound rolls are transferred by a Clark gasoline motor-driven fork truck to the platform of a Toledo scale. After weighing, a Signode strapping unit is used to band each end of the rolls before they are loaded in boxcars or motor trucks for shipment.

Broke and trim from the machine and winder is repulped in an old Dilts V-belt driven breaker beater in the basement and is pumped back to the machine chest.

Drives

Although the winder is electrically driven, the paper machine, from fourdrinier to reel, is driven by a Bagley & Sewell mechanical drive. The line shaft on the main floor is rotated by a single leather belt on flat pulleys from an old Ames Iron Works two-cylinder reciprocating steam engine installed in the basement. This prime mover is satisfactory for the speeds at which the machine is now operated.

From the line shaft, motion is transmitted to each of the seven separate drive sections on the machine by Allis-Chalmers variable speed V-belt drives, to Fawick Airflex clutches, to the Bagley & Sewall spiral bevel-gear drive units which are coupled direct to the machine sections. The calender stack drive is reversing. Draws between sections are remotely controlled from the front of the machine by adjusting the motor driven variable speed V-belt sheaves on the drive units. Similarly, each section of the machine may be stopped and started from the front of the machine by means of the Fawick air-operated clutches on each drive unit. Speed of the paper machine is measured by a Foxboro recording tachometer. Compressed air for the paper machine clutches and other air controls is supplied by two small compressors in the basement.

Acknowledgment

Acknowledgment and thanks is due George Kress, president of Green Bay Paper and Pulp Company for permission to publish this article and to Hu Miller, Curly Lang and George Mackin for their help and co-operation in its preparation.

Mechanical devices reduce hazards

ORA HAZEN
Safety Supervisor
Minnesota and Ontario Paper Co.

▶▶▶ THE EXPERIENCE chart of a fire inspector who has doubled as supervisor of safety mechanical work, shows a series of ingenious safety inventions.

Joseph Bartkowski, an employee of the International Falls (Minn.) plant of Mando since 1922, held various jobs from handling wood to working as a filter and thickener tender in the pulp preparation department. It was while on this latter job that Joe had an accident. He was leaning on a guard rail that had not been properly replaced. The rail gave way and he fell on a revolving belt which threw him to the floor. Luckily he escaped with nothing worse than a badly bruised arm, but that was a lesson in safety that was to chart his daily habits for years to come. In 1949, Joe received a safety award certificate showing that he had worked 23 years without an accident.

Joe became imbued with the spirit of safety; it was not only for his protection but he was constantly on the alert for some idea that would prevent accidents from happening to the other fellow.

After recovering from his mishap, Joe worked for a while as a pipe fitter helper. This led to an offer from a sprinkler company which hired him to install factory sprinklers. After two years, he returned to Mando; was appointed assistant fire inspector, and upon the retirement of his chief was named fire inspector.

As fire inspector he must have a thorough knowledge of fire insurance codes and must keep approximately 31 miles of fire protection piping and over 14,000 sprinkler heads in efficient operating condition. He is also responsible for the upkeep, care and availability of 26,000 feet of fire hose and approximately 550 fire extinguishers, gas masks and respirators.

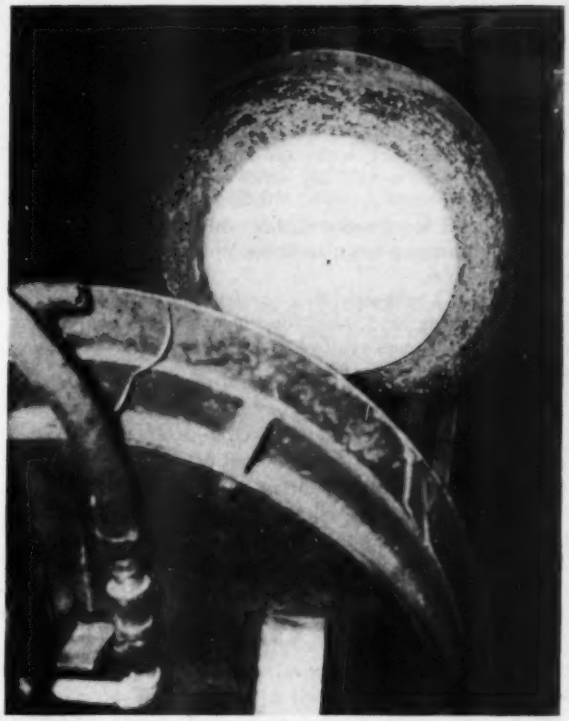


Fig. 2—Drilling header plates and application of air suction keeps paper head in proper position, thus preventing finger injuries

A few years ago, Joe was given the additional duty of supervising safety mechanical work. Since that time he has more than justified his selection by a long series of ingenious safety inventions. Following are a few of the results of his work:

1. Equipped all dual grinding wheels with a single safety glass shield which covers both grinders thereby eliminating grinding hazard when two men are grinding.

2. Provided swinging split cat-walks on the insulation machines to overcome the hazardous task of removing walkways and guard rails when changing cylinders. These cat-

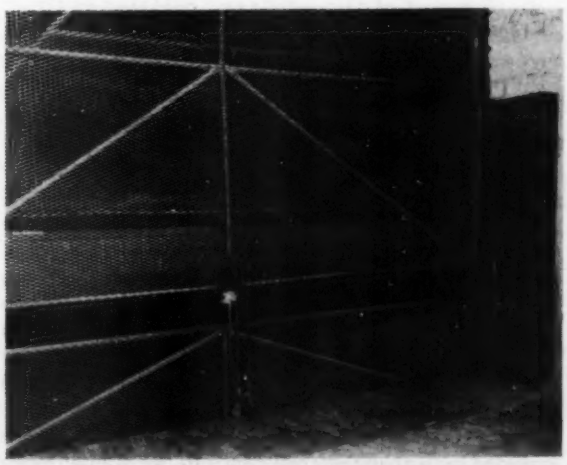


Fig. 1—Split gate for elevator, where there is not enough head room for single gate, prevents employees from getting toes crushed as often happened with old-type gate

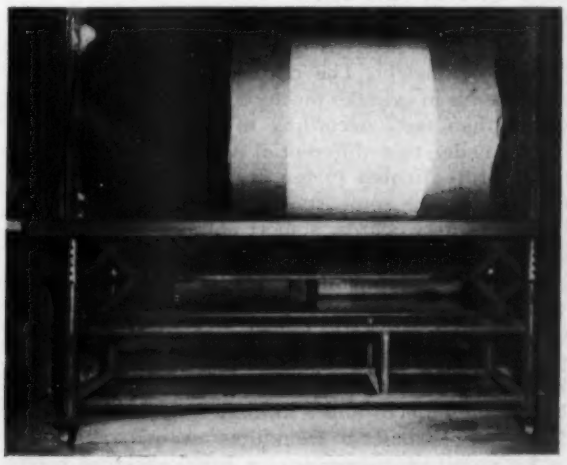


Fig. 3—For double-decking paper rolls in shipping, an automatic loading table which can be adjusted to any desired height, avoids back strain

walks also resulted in a saving of time in getting machines back in production.

3. Changed overhead counter balance wing-type reel guards on paper machine winders to a neat air-controlled disappearing guard when not in use. This eliminates the danger of old-type guards falling on a worker.

4. Covered slippery walkways and smooth cement floor travel areas with wet or dry safety-walk to overcome slipping hazards.

5. Equipped wood room slasher with overhead track and trolley for changing saws, reducing injuries to workers making saw changes.

6. Devised a split gate (top and bottom) for elevator not having sufficient head room for single gate. Now workers do not get their toes crushed as they often did when using the old-type leg gate. (Figure 1)

7. Helped eliminate strains and sprains to workers loading large rolls of paper when using roll pusher by using a product known as "Wet or Dry Safety Walk" on the bearing side of pusher next to paper roll. This material grips the roll and does not slip when roll is forced in position.

8. There have been several injuries to workers' fingers on header presses in the finishing room. Worker would invariably try to straighten out the paper head when the press was closing, as head would bend or be blown by a breeze to a fold at center hanger. Mr. Bartkowski drilled the header plates and had air suction applied to keep the paper head in proper position and alignment. (Figure 2)

9. Telescoping loading table for double-decking paper rolls in box cars. The table is elevated to whatever height desired and roll of paper is easily handled. This table has helped eliminate back strain. (Figure 3)

Paper and paperboard making—VII

HARRY WILLIAMSON

Cylinder Machine Formation Questions . . . Part 2

WE HAVE NOTED THAT the differential in liquid levels, Static Head Pressure, is the effective force *causing* formation. We have noted that the size of the wire mesh is a factor governing the RATE of formation. We also know that as formation proceeds the density of formation offers a gradually increasing resistance to the passage of water and therefore *slows* down the *rate* of formation.

Answer to Question No. 4

Time Rate of Formation Controlled by Density

The pressure exerted by water is equal to 0.4 lb. per foot of height. The differential height between water levels in cylinder machine operation is in inches rather than feet. According to the grade of paper being made, this differential varies from approximately three inches to ten inches of height. In the manufacture of some specialty boards, particularly imitation press boards; a short fibered, well hydrated stock, the level differential will go as high as fourteen inches. In experimental operation this writer has varied this differential from one to thirty inches. One inch difference in water level height is equal to 0.036 pounds pressure psi so that for every inch difference in height we have an operating hydraulic *force* of 0.036 lb. psi pressure to *effect* formation against *all* other factors of resistance to formation.

As a unit of comparison, a 0.009 sheet of corrugating medium board weighing 28.8 lb. per thousand square feet will equal 0.0002 lb. psi of finished board at the dry end of the machine. At the commencement of formation at the wet end of the machine each square inch of board is approximately 0.5 per cent fiber and 99.5 per cent water. The VOLUME WEIGHT of the mixed liquid to make one square inch of this 0.009 pt. board at the *initial* point of formation is 0.04 pounds psi. This volume weight may be termed FLOW WEIGHT VOLUME per square inch of INITIAL FORMATION AREA.

As formation is made possible by the use of static head pressure, and, as this pressure in the amount applied, is *equal* over *every* square inch of submerged formation area, then *any* change in speed or TIME RATE OF FORMATION which takes place *must* be occasioned by a change in resistance to the applied pressure.

Formation will be affected *most* rapidly as the

Formation Questions

Q. No. 1—How is the formation of a sheet of paper from a mixed volume of fiber and water in contact with a revolving wire mesh effected?

Q. No. 2—At what point on the revolving mold does the sheet start to form on the wire mesh?

Q. No. 3—How long does actual formation of the sheet continue to take place round the circumference of the revolving mold?

Q. No. 4—How rapidly does formation take place?

Q. No. 5—What governs the speed of formation?

Answers to Questions 1, 2 and 3 were given in the first part of this installment, published in the August issue. Read answer to Question 5 next month.

cleaned wire surface submerges into the mixed volume. At this point of rotation, the flow of water through the mesh meets *no* resistance from pre-formed fibers and the *velocity* of flow is unimpeded by the water on the *inside* of the mold. As the *same area* of wire mesh, continuing rotation, emerges from contact with the white water on the inside of the mold and is still *in* contact, by virtue of the differential in water levels, with the mixed volume on the *outside* of the mold, the rate of formation again will be accelerated because there is no resistance to the velocity of flow through the wire mesh by the inside water. Between these two points the rate of formation is *gradually decreasing* in proportion to the resistance to the passage of water by the increasing density of the forming sheet. However, with a short fibered, well hydrated stock; short slow stock to form the sheet so densely that *total* formation can be complete at any point in *one* revolution of the formation area in contact with the mixed volume of fiber and water in the circle. Conversely with free stock the formation is bulky rather than dense, the interstices between the fibers are larger, the turbulence caused by the *rush* of water initially through the wire mesh leaves the format or base layer of fibers much more unevenly spread over the forming area. Being free, the fibers of the stock have very little increased surface tension by beating; they will *not cling* together as tenaciously as well beaten fibers; they slip and slide over the face of the formation area constantly exposing areas of free surface for the water to *rush* through. With free stock, the fibers *do not stay* in the position of *original* formation, consequently there is *no gradual decreasing* of the TIME RATE of formation due to resistance of the increasing density of the sheet in formation.

The initial *rush* of water through the clean wire caused the *most rapid rate* of formation and on emergence from the circle area the FLOW WEIGHT of the mixed volume *entering* the circle caused the second greatest amount of formation. It is interesting to note the effect of FLOW WEIGHT VOLUME of the liquid mixture, flowing on a horizontal plane, as it comes in contact with the surface of the revolving cylinder mold. Little ripples across the width of the mold are always in evidence whether the stock used is slow or free, the more free the stock the larger and more turbulent the ripples. As the cylinder mold emerges from the circle the differential of liquid level pressure is still in effect and in addition there is the actual flow weight of the liquid volume as it comes in actual contact with a revolving surface traveling on an arc tangental to the line of flow. With free stock the formation of fiber already accrued on the surface of the wire mesh is so *loosely* held together the flow weight of the contacting liquid *reopens* the loosely held FORMATION, pushing the fibers into small bundles rather than evenly interlocked individual fibers. Through the numerous small openings thus turbulently made water rushes violently through and more fibers are *deposited rapidly*, as a component of formation, in the gaps through which the water passed. The *net* effect is at once apparent on the face of the mold as a slipping, sliding, rolling formation.

By observing and contrasting the operations of a thickener and a save-all (both wire covered cylinder molds) interesting information of the behavior of fibers in formation according to the degree of freeness may be obtained. The thickener, handling raw unbeaten fibers, simply rolls the fibers into large uneven bundles spread in patches over the face of the mold as the water rushes through the coarse wire mesh. The save-all, handling the shortest of the fines in the white water, stock which has been beaten, will actually form a sheet which clings tenaciously to the surface of the wire.

In relation to the question of rapidity or Time Rate of Formation, as far as the *operation* of the cylinder mold is concerned, we may enumerate the following:

(a) The differential in liquid levels of the mixed volume in the circle *outside* the mold and the white water *inside* the mold is the effective hydraulic force which *causes* formation. When these two levels are equal then formation *cannot* take place.

(b) Each one inch of level differential exerts a pressure of 0.036 lb. psi of *submerged* formation area. The greater the level differential the greater the formation force and therefore the more *rapid* the rate of formation.

(c) The most *rapid rate* of formation is the initial formation. This rate may be varied at will by adjustment of the differential in levels. At any differential in levels, application of formation force, the initial formation is *always* the most rapid rate of formation proportionate to the hydraulic pressure exerted.

(d) The speed of formation gradually *decreases* as the *density* of the formation increases. The more free the stock the *less* dense the forming sheet, therefore, the less resistance to formation by passage of water and the more nearly continuous the RATE of formation.

(e) The density of formation is MORE DEPENDENT on the beaten condition of the fibers, slowness or freeness than it is on the hydraulic pressure force exerted.

(f) The more free the stock, the *more rapid* the formation over the *whole* of the submerged formation area, but, the more *loose* and *bulky* the formation of the sheet.

(g) The more slow the stock, the slower the TIME RATE of formation and the *tighter* and more *closely* formed the finished sheet.

(h) Formation will *stop* the instant the formed sheet becomes so dense, either by volume of fiber or tightness of formation or *both*, that it is no longer possible to pass water through the wire mesh by the STATIC HEAD PRESSURE APPLIED.

We have noted that formation on a cylinder mold is *effected* by PRESSURE and *affected* by VELOCITY of flow or the induced suction of water through a wire mesh. We know that when a COMPLETE SEAL is formed over the surface of the wire mesh formation can no longer take place. We know that the gradually forming sheet will offer gradually increasing resistance to the passage of water and therefore a gradually DECREASING RATE of formation. Conversely, we know that a free stock will have a faster maintained rate of formation with a resultant BULKY and OPEN QUALITY of formation. *The gradual and steady rate of formation will result in the most uniform and evenly formed sheet.*

walks also resulted in a saving of time in getting machines back in production.

3. Changed overhead counter balance wing-type reel guards on paper machine winders to a neat air-controlled disappearing guard when not in use. This eliminates the danger of old-type guards falling on a worker.

4. Covered slippery walkways and smooth cement floor travel areas with wet or dry safety-walk to overcome sliping hazards.

5. Equipped wood room slasher with overhead track and trolley for changing saws, reducing injuries to workers making saw changes.

6. Devised a split gate (top and bottom) for elevator not having sufficient head room for single gate. Now workers do not get their toes crushed as they often did when using the old-type leg gate. (Figure 1)

7. Helped eliminate strains and sprains to workers loading large rolls of paper when using roll pusher by using a product known as "Wet or Dry Safety Walk" on the bearing side of pusher next to paper roll. This material grips the roll and does not slip when roll is forced in position.

8. There have been several injuries to workers' fingers on header presses in the finishing room. Worker would invariably try to straighten out the paper head when the press was closing, as head would bend or be blown by a breeze to a fold at center hanger. Mr. Bartkowski drilled the header plates and had air suction applied to keep the paper head in proper position and alignment. (Figure 2)

9. Telescoping loading table for double-decking paper rolls in box cars. The table is elevated to whatever height desired and roll of paper is easily handled. This table has helped eliminate back strain. (Figure 3)

Paper and paperboard making—VII

HARRY WILLIAMSON

Cylinder Machine Formation Questions . . . Part 2

WE HAVE NOTED THAT the differential in liquid levels, Static Head Pressure, is the effective force *causing* formation. We have noted that the size of the wire mesh is a factor governing the RATE of formation. We also know that as formation proceeds the density of formation offers a gradually increasing resistance to the passage of water and therefore *slows* down the *rate* of formation.

Answer to Question No. 4

Time Rate of Formation Controlled by Density

The pressure exerted by water is equal to 0.4 lb. per foot of height. The differential height between water levels in cylinder machine operation is in inches rather than feet. According to the grade of paper being made, this differential varies from approximately three inches to ten inches of height. In the manufacture of some specialty boards, particularly imitation press boards; a short fibered, well hydrated stock, the level differential will go as high as fourteen inches. In experimental operation this writer has varied this differential from one to thirty inches. One inch difference in water level height is equal to 0.036 pounds pressure psi so that for every inch difference in height we have an operating hydraulic *force* of 0.036 lb. psi pressure to *effect* formation against *all* other factors of resistance to formation.

As a unit of comparison, a 0.009 sheet of corrugating medium board weighing 28.8 lb. per thousand square feet will equal 0.0002 lb. psi of finished board at the dry end of the machine. At the commencement of formation at the wet end of the machine each square inch of board is approximately 0.5 per cent fiber and 99.5 per cent water. The VOLUME WEIGHT of the mixed liquid to make one square inch of this 0.009 pt. board at the *initial* point of formation is 0.04 pounds psi. This volume weight may be termed FLOW WEIGHT VOLUME per square inch of INITIAL FORMATION AREA.

As formation is made possible by the use of static head pressure, and, as this pressure in the amount applied, is *equal* over *every* square inch of submerged formation area, then *any* change in speed or TIME RATE OF FORMATION which takes place *must* be occasioned by a change in resistance to the applied pressure.

Formation will be affected *most* rapidly as the

Formation Questions

Q. No. 1—How is the formation of a sheet of paper from a mixed volume of fiber and water in contact with a revolving wire mesh effected?

Q. No. 2—At what point on the revolving mold does the sheet start to form on the wire mesh?

Q. No. 3—How long does actual formation of the sheet continue to take place round the circumference of the revolving mold?

Q. No. 4—How rapidly does formation take place?

Q. No. 5—What governs the speed of formation?

Answers to Questions 1, 2 and 3 were given in the first part of this installment, published in the August issue. Read answer to Question 5 next month.

cleaned wire surface submerges into the mixed volume. At this point of rotation, the flow of water through the mesh meets *no* resistance from pre-formed fibers and the *velocity* of flow is unimpeded by the water on the *inside* of the mold. As the *same area* of wire mesh, continuing rotation, emerges from contact with the white water on the inside of the mold and is still *in* contact, by virtue of the differential in water levels, with the mixed volume on the *outside* of the mold, the rate of formation again will be accelerated because there is no resistance to the velocity of flow through the wire mesh by the inside water. Between these two points the rate of formation is *gradually decreasing* in proportion to the resistance to the passage of water by the increasing density of the forming sheet. However, with a short fibered, well hydrated stock; short slow stock to form the sheet so densely that *total* formation can be complete at any point in *one* revolution of the formation area in contact with the mixed volume of fiber and water in the circle. Conversely with free stock the formation is bulky rather than dense, the interstices between the fibers are larger, the turbulence caused by the *rush* of water initially through the wire mesh leaves the format or base layer of fibers much more unevenly spread over the forming area. Being free, the fibers of the stock have very little increased surface tension by beating; they will *not cling* together as tenaciously as well beaten fibers; they slip and slide over the face of the formation area constantly exposing areas of free surface for the water to *rush* through. With free stock, the fibers *do not stay* in the position of *original* formation, consequently there is *no gradual decreasing* of the TIME RATE of formation due to resistance of the increasing density of the sheet in formation.

The initial *rush* of water through the clean wire caused the *most rapid rate* of formation and on emergence from the circle area the FLOW WEIGHT of the mixed volume *entering* the circle caused the second greatest amount of formation. It is interesting to note the effect of FLOW WEIGHT VOLUME of the liquid mixture, flowing on a horizontal plane, as it comes in contact with the surface of the revolving cylinder mold. Little ripples across the width of the mold are always in evidence whether the stock used is slow or free, the more free the stock the larger and more turbulent the ripples. As the cylinder mold emerges from the circle the differential of liquid level pressure is still in effect and in addition there is the actual flow weight of the liquid volume as it comes in actual contact with a revolving surface traveling on an arc tangental to the line of flow. With free stock the formation of fiber already accrued on the surface of the wire mesh is so *loosely* held together the flow weight of the contacting liquid *reopens* the loosely held FORMATION, pushing the fibers into small bundles rather than evenly interlocked individual fibers. Through the numerous small openings thus turbulently made water rushes violently through and more fibers are *deposited rapidly*, as a component of formation, in the gaps through which the water passed. The *net* effect is at once apparent on the face of the mold as a slipping, sliding, rolling formation.

By observing and contrasting the operations of a thickener and a save-all (both wire covered cylinder molds) interesting information of the behavior of fibers in formation according to the degree of freeness may be obtained. The thickener, handling raw unbeaten fibers, simply rolls the fibers into large uneven bundles spread in patches over the face of the mold as the water rushes through the coarse wire mesh. The save-all, handling the shortest of the fines in the white water, stock which has been beaten, will actually form a sheet which clings tenaciously to the surface of the wire.

In relation to the question of rapidity or Time Rate of Formation, as far as the *operation* of the cylinder mold is concerned, we may enumerate the following:

(a) The differential in liquid levels of the mixed volume in the circle *outside* the mold and the white water *inside* the mold is the effective hydraulic force which *causes* formation. When these two levels are equal then formation *cannot* take place.

(b) Each one inch of level differential exerts a pressure of 0.036 lb. psi of *submerged* formation area. The greater the level differential the greater the formation force and therefore the more *rapid* the rate of formation.

(c) The most *rapid rate* of formation is the initial formation. This rate may be varied at will by adjustment of the differential in levels. At any differential in levels, application of formation force, the initial formation is *always* the most rapid rate of formation proportionate to the hydraulic pressure exerted.

(d) The speed of formation gradually *decreases* as the *density* of the formation increases. The more free the stock the *less* dense the forming sheet, therefore, the less resistance to formation by passage of water and the more nearly continuous the RATE of formation.

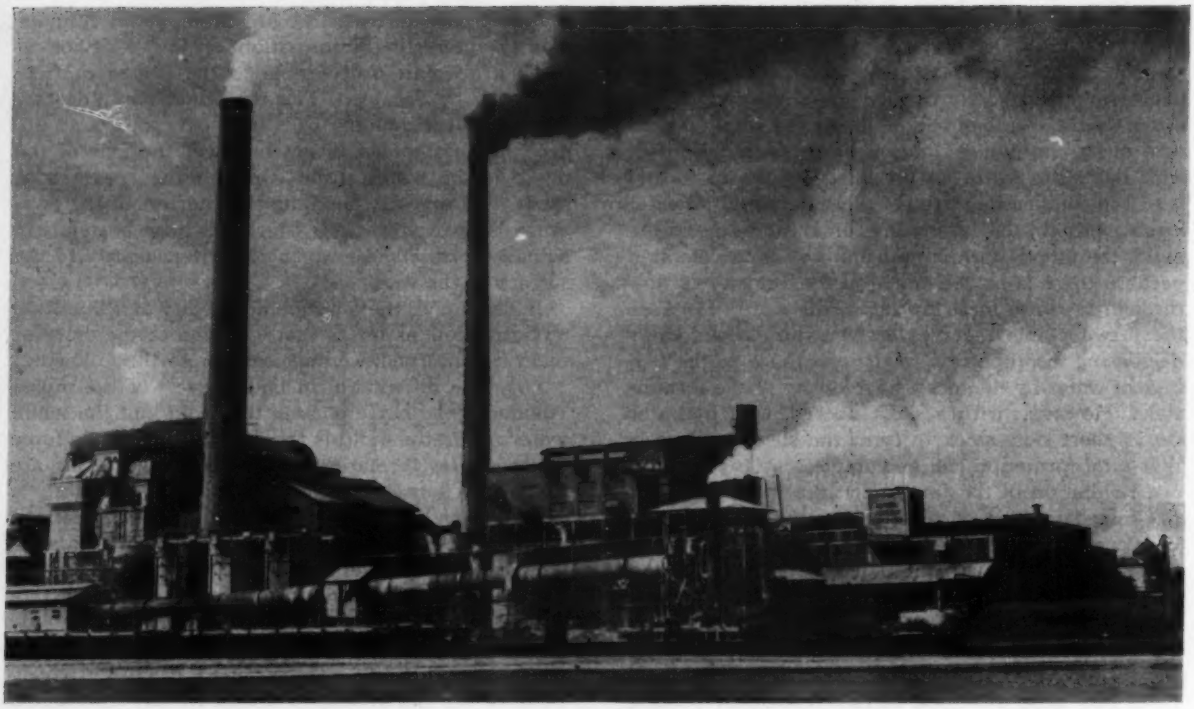
(e) The density of formation is MORE DEPENDENT on the beaten condition of the fibers, slowness or freeness than it is on the hydraulic pressure force exerted.

(f) The more free the stock, the *more rapid* the formation over the *whole* of the submerged formation area, but, the more *loose* and *bulky* the formation of the sheet.

(g) The more slow the stock, the slower the TIME RATE of formation and the *tighter* and more *closely* formed the finished sheet.

(h) Formation will *stop* the instant the formed sheet becomes so dense, either by volume of fiber or tightness of formation or *both*, that it is no longer possible to pass water through the wire mesh by the STATIC HEAD PRESSURE APPLIED.

We have noted that formation on a cylinder mold is *effected* by PRESSURE and *affected* by VELOCITY of flow or the induced suction of water through a wire mesh. We know that when a COMPLETE SEAL is formed over the surface of the wire mesh formation can no longer take place. We know that the gradually forming sheet will offer gradually increasing resistance to the passage of water and therefore a gradually DECREASING RATE of formation. Conversely, we know that a free stock will have a faster maintained rate of formation with a resultant BULKY and OPEN QUALITY of formation. The *gradual and steady rate of formation will result in the most uniform and evenly formed sheet.*



THE MILL —an asset to the community, a credit to the industry—improvement program keeps plant modern and efficient

Twelve years of progress

Samuel Kipnis
President

Albert H. Edwards
Vice President

William T. Webster
V. P. and Gen. Mgr.

W. M. "Judge" Cary
Plant Manager

B. H. Buck
Chief Engineer

R. H. Laftman
Consultant

THE MEN —behind every successful enterprise are men of foresight and action

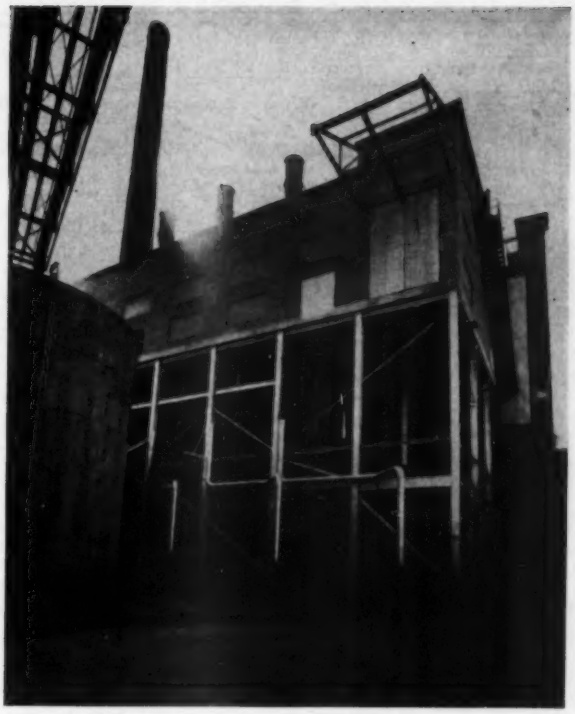
The phrase, "Always building—never built," often is used to describe the ever-changing chemical industry. It is equally applicable to pulp and paper manufacture. One outstanding paperboard mill that typifies the progress and enterprise of this industry is the National Container Corp. Kraft Pulp and Board Division plant at Jacksonville, Fla.

This mill started operation in the spring of 1938. At that time, it was one of the most up-to-date kraft pulp and paperboard mills in the country. Now, twelve years later, it is still one of the most modern. Why? Because it never has stopped building. Because practical, economy-minded management has held to the theory that it pays to modernize—that obsolete equipment and processes are a detriment to efficient, profitable operation.

Top responsibility for the company's growth and development lies with its president, Samuel Kipnis, and with Albert H. Edwards, vice president, and William T. Webster, vice president and general manager. Richard H. Laftman, up to the time of his retirement, had a most important part in the building of National Container. He is still retained as mill consultant. Other key executives at Jacksonville are: R. H. Stevens, technical director; W. M. Cary, plant manager; O. Winningham, general superintendent; B. H. Buck, chief engineer; W. C. Hayes, paper mill superintendent; K. M. Guest, chief chemist; M. J. Farris, pulp mill superintendent; J. E. Mailhos, power plant superintendent.

A couple of years ago, K. M. Guest, chief chemist at Jacksonville, started compiling a list of the various improvements that had been made since the mill was first built. Now, this review has been brought up to date and is presented herewith.—Editors

New electrostatic precipitator (Koppers) helps prevent loss of chemicals to atmosphere



New washer building is built over the filtrate tanks to conserve needed space

at National Container Corp., Jacksonville

K. M. GUEST
National Container Corp.

▶▶▶ LOCATED ON THE west bank of the St. Johns River in Jacksonville, Fla., the Kraft Pulp and Board Division of National Container Corp. occupies an area of about 15 acres. It was originally designed and built to produce about 200 tons per day of kraft pulp and board. Now, without any additional land, the mill has been expanded to nearly double its original capacity. Hemmed in on all sides, plant expansion has been possible only by encroachment on the river, by going up into the air, and by fitting things together with the proverbial shoehorn. From wood to finished paperboard, all processes have been modernized and expanded. Throughout the mill, obsolete and worn-out equipment has been replaced in an effort to keep operations at top efficiency.

Wood Supply

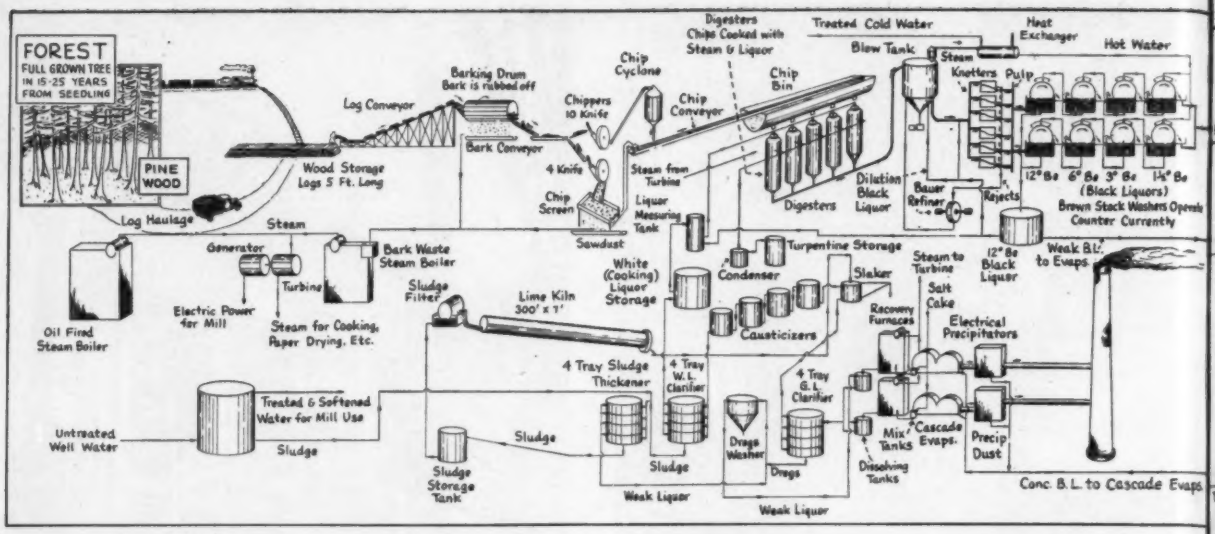
Wood supply has not changed and is still received in 5-foot lengths by truck and rail from forests relatively near Jacksonville. Catfaces are generally used as fuel wood with better grades used to some extent for pulp.

Mill yard storage has expanded to allow an inventory of approximately 15 days' supply. Sufficient space was not available within the mill yard, so the space across the street was utilized. Facilities are now provided to allow a complete turnover of inventory each three months. Whereas wood received by truck is placed in the mill yard and reclaimed for use by a cross-haul chain conveyor, other arrangements were necessary for the new storage yard. Here rack cars are unloaded by a 45-ton Orban railroad crane with a grapple, and the wood is piled into bins. For movement to the mill, this crane picks up wood with an orange-peel grapple and loads two GM trucks equipped with dump bodies for transport to the yard conveyor.

Log-haul equipment has undergone numerous repairs but no major changes. The original barking drum (12 x 45 ft.) into which the logs were discharged has been replaced by a new drum of the same type but 5 ft. shorter. This new drum was also made by Carthage Machine Co. and was fabricated at the mill like its predecessor. In order to handle the increased quantity of wood, this shorter drum is rotating faster than the one it replaced. A second drum with the necessary conveyors is being added.

Wood Room

At the discharge end of the conveyor from the drum barker an additional chipper has been added, and feed of logs to either chipper can be controlled by a hydraulically operated gate. The original 4-knife 88-inch Carthage chipper is now used to cut catfaces and these chips go over the 5 x 12 ft. Tyler Niagara screens with oversize particles going to the Lombard chip crusher. Depending on their quality, chips from this unit may be used to supplement the fuel supply for the boilers, or they may be used for pulp. The new 10-knife Carthage chipper is belt driven by a 400 hp., 2300 volt motor and does away with the need for screens and elevators to the chip conveyor. Vanes are welded to the periphery of the disc and serve to break up the chips and to blow them to a cyclone collector directly over the chip conveyor.



Most catfaces are utilized for fuel and they are now separately handled and chipped. Catfaces, thrown from the car to the ground, are picked up by a Drott skidder mounted on a Caterpillar tractor and piled near the catface conveyor. As needed, these catfaces are chipped by a 60-inch hog made by the Diamond Iron Works. This hog is designed for 36 knives, but only 18 are being used. It is powered by a 250 hp., 2,300 volt motor, and the rated capacity is 30 tons per hour. Chips from this hog together with bark from the drum barker are conveyed to the fuel bins.

For proper maintenance of knives for all chippers, a new 12 rock knife grinder, manufactured by the Bridgeport Safety Emery Wheel Co., has been installed, replacing the original grinder. This grinder is equipped with magnetic bed for knife setting and is capable of grinding a full set of knives for the old 4-knife chipper or ½ set for the 10-knife chipper.

Chip and fuel conveyor systems are the same as the original installation; and these belt conveyors carry the load to the chip bins and fuel hoppers. The chip bins are the same 30,000 cu. ft. catenary bins plus the addition of a new bin over a recently erected new digester. The chips are distributed along the bin by a belt conveyor with selective drop where needed. Vibrators are installed on each bin to speed up loading of digesters and to do away with the use of steam for loosening the chips.

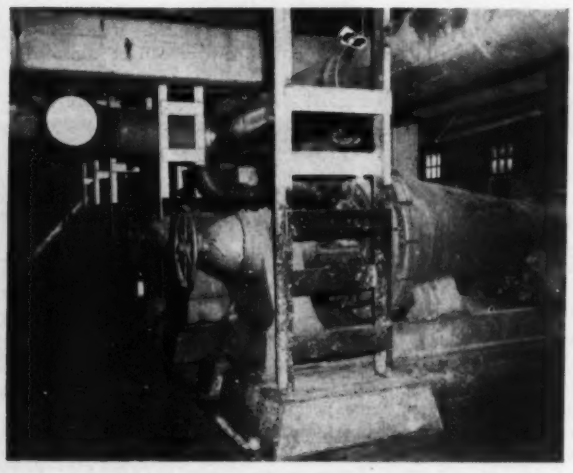
Digesters

The original digester room installation of four digesters has been revised to such an extent that cooking today bears no resemblance to cooking 12 years ago. The removal of the indirect liquor heaters was one of the first moves made, and this was followed later by the removal of the screens in the digesters and of the circulating pumps. Today, cooking is done by direct steaming with no circulation by pumping. Steaming is accomplished through the use of 130 lb. steam throughout and gas-off is handled manually.

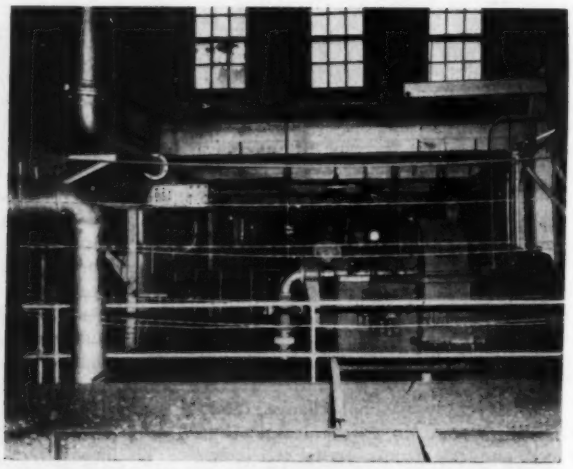
Installation of the 10-knife Carthage chipper, giving more uniform chips and removal of the screens, increased the yield of each cook by over 15 per cent. Also, the original blow valves, manually operated by a blow-man, have been replaced with eight-inch Yarway electric-control valves operated from the digester floor.

Digester room capacity has been increased by the addition of a fifth digester. This digester is only 9/10 the capacity of the older digesters and the bottom is cone-shaped rather than dish-shaped.

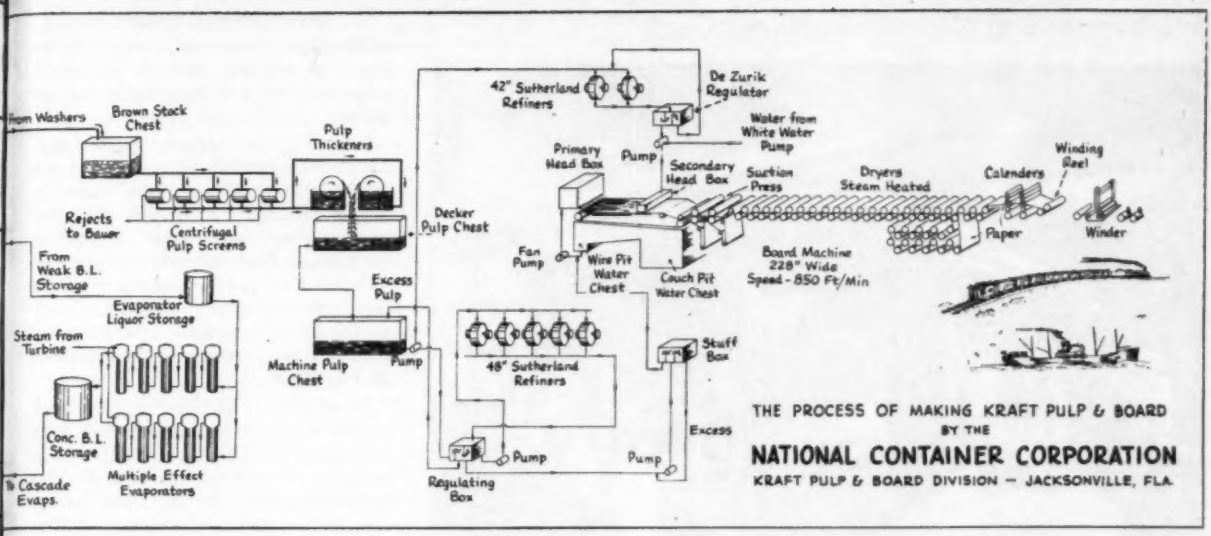
As the four original liquor heaters were removed, they were not discarded entirely. One was used in an installation for the recovery of turpentine—a step that was not included in the original plans but which, since its installation,



OLD jordans have been replaced by——



NEW Sutherlands—stock goes direct from refiners to machine



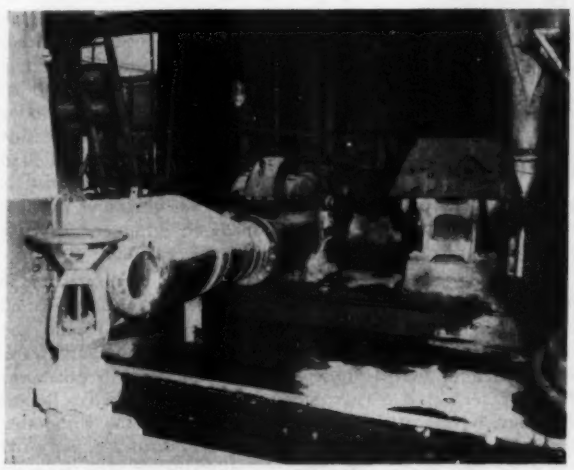
has proven a good investment. Another was added to the surface condenser to aid in the conservation of heat energy for hot water to be used for pulp washing. Of the remaining two, one was sent to another National Container mill and is in use there; and the other was sold to an outside mill. A new Impco blow tank agitator has been installed, and a consistency controller maintains constant pulp consistency.

Pulp Washing

In the initial wash room 12 years ago, the pulp was washed on three 8 x 12 ft. Impco vacuum washers arranged in tandem for counter-current washing and vacuum was achieved through the use of vacuum pumps. These vacuum pumps caused excess foaming and were soon removed. Vacuum was then achieved through the barometric leg of liquor. In order to increase the tonnage, an 8 x 12 ft. washer was added as a fourth stage of washing. Some years later, 3 Jonsson knotters were installed between the blow tank and the washers to remove the uncooked rejects before washing. The screened pulp was then washed to a much higher degree of efficiency and the rejects were returned to the chip bin to be mixed with chips for re-cooking. In spite of the above additions the tonnage needed over the washers could not be obtained with the degree of washing necessary to make a quality product with low chemical loss.

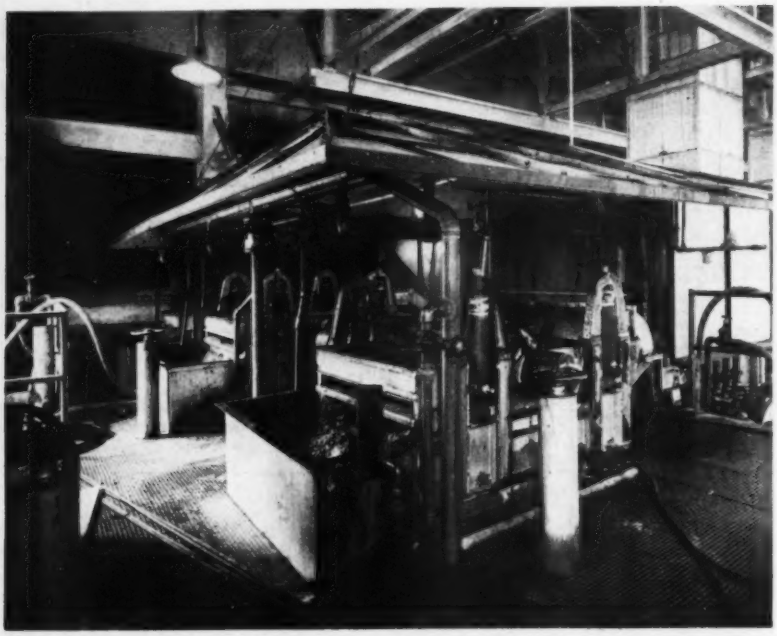
Therefore, to achieve this desired tonnage and to reduce the chemical loss, the present washer room was designed. This wash room is on the opposite side of the digester building from the original installation and is in a building built above tanks and on a level approximating the digester floor. Here 6 Jonsson knotters precede two lines of four 8 x 12 ft. Impco vacuum washers. Of this equipment, three knotters and one line of four 8 x 12 ft. washers are new equipment of the latest design. This new equipment was placed in operation to supply the mill while the old equipment was being moved from its old location to this new building. New and additional tank storage capacity has been added to care for the increase in tonnage.

Effluent of the first vacuum washers represents the highest strength black liquor and this is further concentrated in two lines of quintuple effect vacuum evaporators. Here again, expansion has taken place. The original five bodies supplied by Goslin-Birmingham were first supplemented by the addition of two bodies, and operation was of a seven-body quintuple effect. Further expansion was made by the addition of three more bodies supplied by General American Transportation Co. The 10 bodies were then placed in operation as two lines of five bodies each. Pumps on the second line are Worthington, whereas the original line still is equipped with La Bour pumps. Vacuum for both lines is supplied by barometric con-

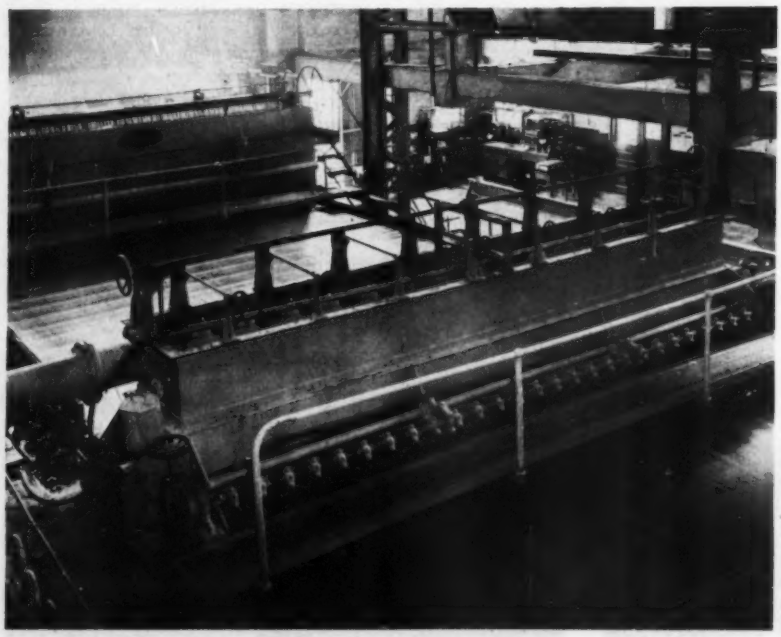


OLD 15,000 gpm fan pump has been replaced by——

NEW Worthington 25,000 gpm fan pump on the paper machine



Three Jonsson knotters precede the new Impco 4-stage brown stock washer



Secondary headbox (Valley) on Pusey & Jones fourdrinier increased production

densers operating on river water. Complete instrumentation of both lines is by Bristol instruments.

Recovery Units

Heavy black liquor from the evaporators is further concentrated in cascade evaporators utilizing heat from the recovery furnaces. Shortly after the mill started, a 175-ton Combustion Engineering spray type recovery unit was installed to replace the two original Murray-Waern recovery units. For some years, the mill operated on this single unit, but as expansion of other departments took place, more recovery capacity was needed. This need led to the conversion of one Murray-Waern unit to a spray type recovery unit having a capacity of approximately 75 tons per day, while the other original unit was converted to a bark burning boiler.

In order to effect greater savings of chemicals and to cut down on losses from the recovery through the stack, a Cottrell electrical precipitator was installed.

In spite of the addition of the larger recovery unit and the conversion of one of the Murray-Waern units, more recovery capacity was needed. This led to the recent installation of another Combustion Engineering spray type unit followed by a complete overhaul of the older unit. It is felt that upon completion of this overhaul, it will be possible to stop operations of the converted Murray-Waern.

In addition to the new recovery unit, a new Koppers precipitator has been installed to handle the increased volume of gases. Installing the new furnace meant relocating the salt cake storage and the old Cottrell precipitator. This was accomplished by building a new salt cake storage and then locating both the Cottrell and Koppers precipitators over this storage.

Caustic Room

Equipment for causticizing green liquor has undergone many changes. Three of the four decanters originally supplied by Mount Chemical Equipment Co. have been converted to 4-tray clarifiers used for green liquor and white liquor classification, and sludge washing. The fourth decanter has been converted to a two-tray unit for dregs washing. Work of converting these was done under the direction of the Dorr Co., so that these are now classed as regular Dorr clarifiers. Dorr has also furnished a combination slaker and classifier, and this is followed by four causticing tanks, of which two were the original installation, and the other two were originally used for dregs washings.

The original sludge feed tank and and two Mount vacuum mud filters have been moved and one of the filters was later replaced by an Impco filter large enough to handle the entire mud feed. This filter move was made at the time of replacement of the old 9 x 135 ft. lime kiln. A new 7 x 300 ft. Traylor kiln was installed on the opposite side of the clarifiers. The new kiln is fired by oil, and although kiln installation is only three years old, numerous changes have been made to bring about better and more efficient operations.

Storage silos have been erected to replace the old lime storage building and accommodate both reburned lime and make-up quicklime. An auxiliary warehouse has been built for salt cake storage. Storage tanks for the various liquors have been increased in line with other expansion, but fuel oil storage, hot water storage, and pulp storage have remained practically the same.

Screening and Refining

Washed pulp from the two lines of vacuum washers drops to the brown stock chest from which it is pumped to the screen room. During the years, four Impco centrifugal knotters were added to remove the larger rejects ahead of the screens, but installation of the Jonsson knotters before washing has allowed discontinuing the use of these knotters. Now the washed pulp passes to five Impco centrifugal screens with two of them as tailing screens. This has meant the addition of two screens during the past years and is being followed by two more screens of the same type. In the meantime, a 14-plate flat screen and refiner have been discontinued and removed. A second 8 x 10 Impco vacuum thickener has been added to handle the screened stock to the decker chest.

None of the original eight jordans remain but one had been added during the years so that a total of nine have been replaced by five 48-inch Sutherland refiners and two 42-inch Sutherland refiners. The five 48-inch refiners are used on stock for the primary headbox of the paper machine, whereas the two-42-inch refiners handle stock for the secondary head-box. A sixth 48-inch refiner is now being added for primary stock.

The stock preparation system also consists of two De Zurik regulators for controlling consistencies to the refiners, Eriez magnets for removal of tramp iron, two original chests both still equipped with propeller agitators, size feeder, and automatic alum feeder. The original Hercules P. H. C. size emulsification system is also in use.

Paper Machine

The 228-inch Pusey and Jones fourdrinier has not been enlarged, but numerous changes have been made in order to increase tonnage. The original 15,000 gpm fan pump has been replaced by a 25,000 gpm Worthington pump. The primary head-box was re-equipped with an inlet of the latest design by Valley Iron Works. A 90 ft. wire is still used, but vacuum capacities of the suction boxes and couch have been increased and the old vacuum pumps replaced with Nash pumps. Some of the flat boxes have been increased from 7 to 12 inches to provide greater water removal; but one of the most noticeable additions has been a secondary head box supplied by Valley Iron Works. The suction couch supplied by Downingtown remains but the two suction presses have been changed from rubber to brass.

Dryer arrangement of 54-60 inch paper dryers preceded by a 36-inch leading dryer have remained the same but twenty-three 48-inch paper dryers and eight felt dryers were added in the basement section to give greater capacity. This addition brought about a rearrangement of dryer felts and felt dryers to allow full use of the sixteen 48-inch felt dryers. A new drainage system has been installed on the paper machine dryers.

To aid in removing evaporated moisture, a Ross-Grewin system and hot air blowers have been installed to eliminate moisture pockets. Also, the original six exhaust fans in the Walker-Jamarr Co. transite hood have been increased to 11.

The calender installation of two 8 roll calender stacks, and the Pope type reel, are still in use but the stacks have been spread to allow installation of calender dryers. This work is now underway. The two drum Pusey-Jones winder is still in use, and National Container is proud of the safety collar used on the winder shaft as this collar was designed by one of the company employees.

The paper machine drive has not been changed other than to be enlarged for the new dryers. The drive system still consists of a synchronous motor driving a variable voltage generator to supply current to variable voltage DC motors on sections. Proper control is still maintained through the General Electric Selsyn system.

The original Pusey-Jones winder and controls, the 15-ton 5-motor Northern electric crane, the 54-inch Dilts broke beater, and elevators for handling finished rolls are still in service and doing yeoman work with only moderate maintenance having been required.

Steam

Steam generation, all at 450 psi. pressure and 700 F., is accomplished through the 175-ton Combustion Engineering recovery unit, the redesigned spray recovery unit from the Murray-Waern, the redesigned bark boiler from the Murray-Waern, the original 30,000 lb. per hr. Combustion Engineering bark boiler and the 100,000 lb. per hr. oil fired B & W boiler. The four waste heat boilers operate at uniform loading with the oil fired B & W carrying the swing load. All boilers can be fired on oil. Dust collectors have been installed on both bark boilers to eliminate carry-over of unburned particles to the stacks.

Treatment of water for boilers has undergone several changes. Present treating equipment for boiler water consists of an Infilco Accelator for cold lime-soda treatment followed by filtering through pressure filters before treatment by Cochrane acid Zeolite. Water treated in this manner goes through a deaerating heater and phosphate treatment before entering the boilers.

Treatment of all mill supply water came approximately one year after operations started and is accomplished through use of a Wallace & Tiernan chlorinator followed by partial softening in an Infilco Accelator for calcium removal. Sludge from the Accelator is pumped to the caustic room to be reburned in the lime recovery in order to reduce make-up lime requirements.

Power

Electricity requirements were originally filled by one 6250 kv-a General Electric double bleeder turbo generator unit operating in parallel with the adjacent municipal generating station. Power from this outside source was used almost from the start as requirements exceeded the capacity of the single generator. During the war years, a supplementary power unit was added—a Westinghouse 1875 kv-a, but as the mill expanded, purchase of power was still a necessity. Finally, in 1947 a third turbo generator was added—a General Electric of the size of the original unit. Power requirements are now being met by the two General Electric turbo-generators with the turbines arranged to bleed steam for process requirements at 130 lb. and 50 lb. pressures. Surface condensers and strainers are installed on each boiler and large circulating pumps supply water from the St. Johns River for this purpose.

Finally, in the power department, a new 250-foot high brick stack was constructed by Alfonse Custodis to serve the recovery units of the mill and for this reason was located near the precipitator installations. At the time the new stack was placed in service, the original 250-foot high concrete stack erected by Weber Construction Co. was left for use by the bark boilers.

Stream Improvement

Since the mill first started, every effort has been made to prevent pollution of the St. Johns River. Although previous investigations showed no evidence of pollution, further studies were made in 1949. The final report of the "Joint Sanitary Survey by the Florida State Board of Health and National Council for Stream Improvement" was made public in June, 1950. The following conclusions pertaining to the Jacksonville mill were taken from this report:

"An analysis of physical observations and chemical and potentiometric determinations revealed the following: The effects of the discharge of National Container Corp. mill on the body of the river are slight. The minimal effect of the waste from this mill is due to the high efficiency of the mill recovery system, the great dilution factor in the river and appreciably tidal activity. The mill effluent was analytically detectable in the river only in the immediately vicinity of the bulkhead outfall. The water of the river was in no way affected in relation to its present uses, and aquatic life in no way damaged."

H. R. MacMillan Export Co., Ltd., starts up new 225 ton mill near Nanaimo, B.C.

New Harmac mill producing unbleached kraft

▸▸▸ ON THE EAST SHORE of Vancouver Island, about two and one-half hours by ferry from Vancouver, is a new $19,000,000 bleached kraft pulp mill. Built by the H. R. MacMillan Export Co., Ltd., as part of a long range program toward greater utilization of forest resources, it depends substantially on the waste from its various lumbering operations on Vancouver Island for its raw material.

Designed to produce 225 tons per day of sulphate pulp, the mill started operations early last month, turning out unbleached pulp only since the bleach plant will not be ready to operate until early in 1951. At present the new mill employs about 200 persons.

The trade-mark HARMAC appears on every bale of pulp shipped from the new plant. It also designates the shipping point at the mill which, before construction started two years ago, was just a stretch of rocky coastline a few miles south of Nanaimo. The central location with respect to raw materials and the proximity to Nanaimo, one of Vancouver Island's leading centers, were important factors in choosing the mill site. Having built its own wharves and railroad car barge slip, the mill can ship its products and receive supplies direct by boat, barge, motor truck and railroad (via barge to Vancouver).

The entire job of design, engineering, supervision of construction, and starting up of the plant, was handled by Howard A. Simons, consulting engineer of Seattle and Vancouver, B. C., whose organization consisted of a staff of engineers and draftsmen as well as purchasing and cost control departments. Construction of the mill and installation of equipment was handled by the B. C. Bridge and Dredging Co., Ltd., of Vancouver.

Much earlier, however, MacMillan officials had studied the subject of waste wood utilization with such authorities as Dr. J. S. Bates, Price & Pierce, Ltd. (formerly superintendent of the Forest Products Laboratories of Canada), Dr. E. S. Jahn, director of research, New York State College of Forestry, Syracuse, and E. S. Fellows, chief forester, Eastern Rockies Forest Conservation Board, Calgary. The result of these studies led to the selection of the sulphate or kraft process as the most suitable for pulping the various types of wood and wood waste prevalent among the company's timber holdings and wood manufacturing plants.

Responsible for developing the pulp mill project for MacMillan was Clifford Crispin, now manager of the company's pulp division. He has been with the company for nearly 25 years and prior to the building of the pulp mill had been in charge of new products development.

L. G. Harris, superintendent of the pulp mill, D. H. Baker, technical director, and R. E. Simpkins, chief engineer, were with the H. A. Simons during construction and before that had long backgrounds of pulp mill experience. Other key men on the Harmac operating staff are G. S. G. Jones, assistant chief engineer; E. F. Machell, chief chemist; M. A. Plant, chief steam engineer; C. Evans, wood room foreman; W. Karjala, electrical foreman; S. C. Peterson, chief electrician; and D. B. Rankin, office manager.

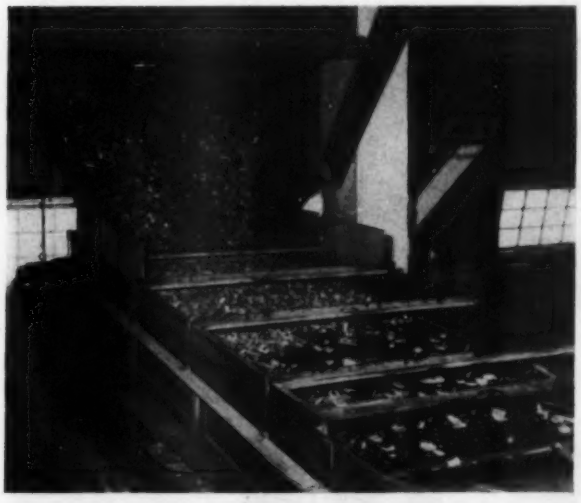
Wood preparation

Major types of wood used are (1) sawmill, planer mill and plywood mill waste and (2) cull logs generally unsuitable for lumber. Chips and hog fuel received by barge from the sawmill chipping plants are unloaded with a Colby 5-ton double cantilever grab bucket unloader with a 4 cu. yd. bucket and an effective reach of 64 ft. on each side. Chips and hog fuel

Log haul chain from pond brings salvage logs to the Sumner cutoff saw in the wood mill

Chips and hog fuel arrive by barge and are unloaded with this 5 ton Colby double cantilever grab bucket unloader

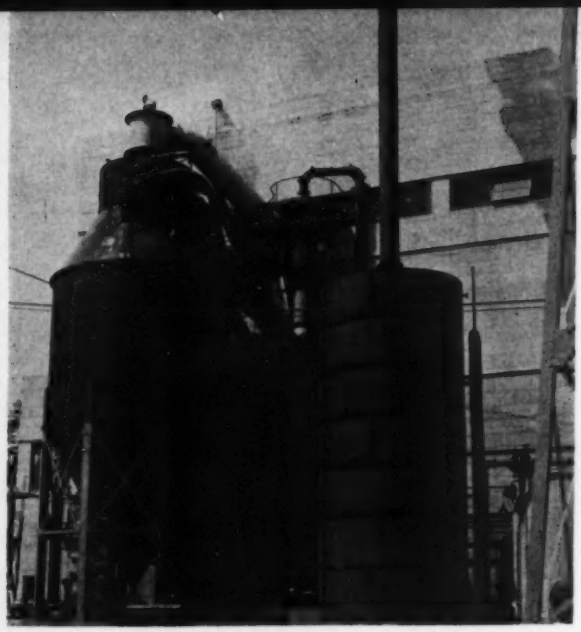
Clean logs go through the Sumner 153 inch, 6 knife chipper driven by a 1500 hp EMM synchronous motor



One of three Orville Simpson "Rotex" chip screens fed from surge bin; accepted chips are conveyed to storage silos

Hog fuel storage building (left); seven chip silos provide separate storage for different wood species

Ranney well pump house; Byron Jackson deep well pumps deliver water through 40 in. dia. 6 mile pipe line to mill



Digester blow tank and accumulator tank for recovering heat from blow steam by Rosenblad system

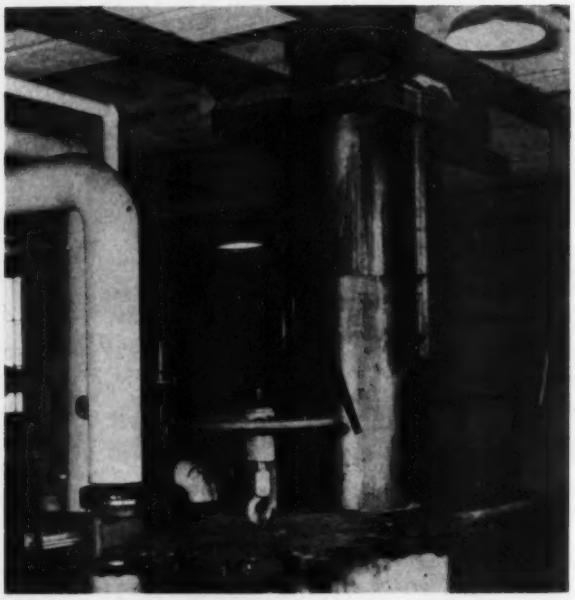
HARMAC Builders

Clifford Crispin
Manager, Pulp Div.

L. G. Harris
Superintendent

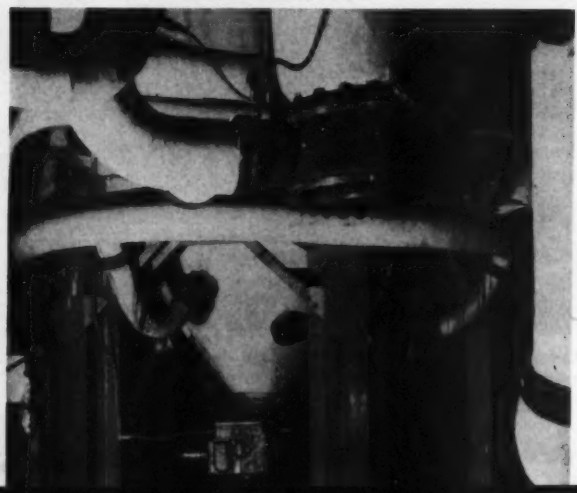
D. H. Baker
Technical
Director

Howard A. Simons
Consulting
Engineer



Digester operating floor; SS lined digesters are filled through rail-suspended chute

Digester bottom; Yarway electrically operated blow valve and Esco SS circulating heater (foreground)



are discharged to the hopper built in the crane structure and then to the belt conveyor system. Chips go direct to the surge bin in the screen room and hog fuel is conveyed to storage. The crane may also discharge direct to outdoor storage when desirable.

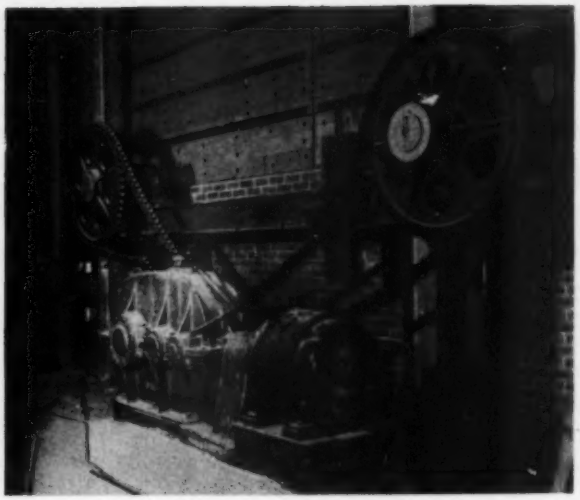
The wood mill is employed mainly for make-up and to provide chips of different species so that uniform mixtures can be charged to the digesters. At the head of the log haul, which has a Pacific-Western 2-speed drive unit, logs are cut into lengths by a Sumner cut-off saw. Bark is removed by a hydraulic barker designed by H. A. Simons (described in *The Paper Industry and Paper World*, Dec. 1949, p. 1054). High pressure water at 1400 psi for the rotating jets of the hydraulic barker is supplied by a Bingham multistage pump driven by a 1250 hp Electric Machinery Mfg. Co. induction motor. Bark is dewatered by a Tyler screen and sent through the Gruendler swing hammer hog and then to a hog fuel storage.

Clean logs up to 34 inches diameter are chipped by a Sumner 153 inch, 6 knife chipper driven by an Electric Machinery Mfg. Co. 1500 hp synchronous motor. Chips are conveyed to a surge bin in the screen building. All chips from all sources are screened here. Link-Belt rotary vane feeders supply the three Orville Simpson "Rotex" chip screens. Fines and sawdust are sent to the hog fuel conveyor while oversize material goes to the Carthage 34 inch, 10 knife rechipper and then is recycled to the screens. Accepted chips are conveyed to the storage silo.

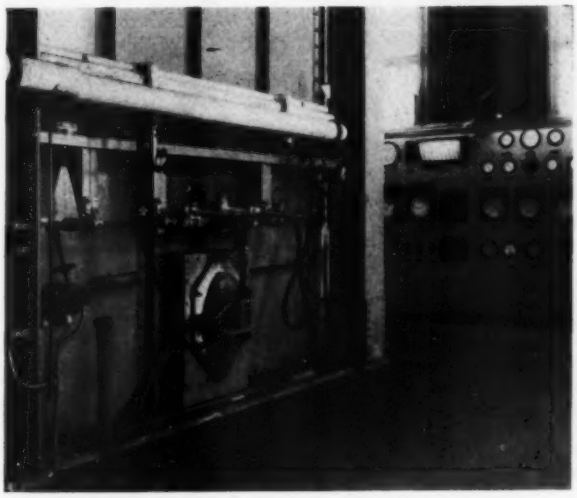
Chips of different species—Douglas fir, hemlock, cedar, etc., are stored in separate silos and are blended prior to use. Each of the seven concrete silos are 72 ft. high x 42 ft. dia. and will hold 275 units (of 200 cu. ft.) of chips. Silos are built with conical steel hopper bottoms and Link-Belt rotary plate feeders which proportion the chips to the 42 in. wide belt conveyor that charges the digesters by mean of a self-propelled automatic tripper. A Weightometer on the belt conveyor measures the chips to the digester. The chip conveyor system and automatic trippers were furnished by Chain Belt Co. with conveyor belts by Goodyear Tire & Rubber Co. The hog fuel conveyor system was supplied by Link-Belt using Dunlop conveyor belts.

Tramp iron is removed from chips and hog fuel brought in from the outside by the use of Eriez permanent magnets installed in the conveyor systems. A magnetic pulley on the screen reject conveyor removes tramp iron ahead of the rechipper.

Jonsson knotters precede the 3-stage Sherbrooke brown stock washers; washed pulp is stored at 12 per cent consistency



Strong black liquor from the sextuple effect evaporator is further concentrated in the Murray cascade evaporator



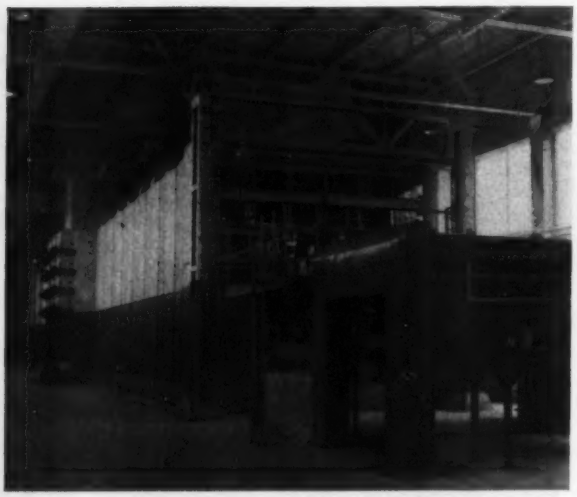
Combustion Engineering recovery unit burns concentrated black liquor which is sprayed into the furnace

Operating floor above Cottrell precipitator which removes chemical dust from recovery furnace flue gas

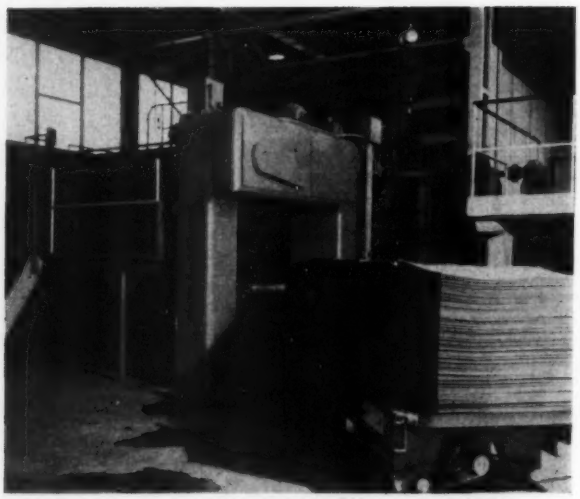
Oliver filter washes and dewaters lime sludge before it goes to the recovery kiln

Traylor lime recovery kiln burns lime rock with lime sludge; Dorr continuous recausticizing system in background

HARMAC Pulp machine—178 inch wide fourdrinier wet-end and press section built by John Inglis Co., Ltd., and Flakt dryer by Paper Machinery Ltd.



Flakt hot air multipass dryer is 133 ft. long, has retention time of about ½ hr.



Cutter and automatic layboy (Lamb-Grays Harbor Co.) delivers stacks of cut sheets to be weighed before baling

Cooking operations

Chips are cooked by the sulphate process in four 4700 cu. ft. capacity conventional shape John Inglis digesters. They are of welded construction, stress relieved and have a 7/64 in. lining of type 316 stainless steel. Digesters are equipped for indirect heating with Esco liquor circulating system, each of which comprises a strainer, heater and 2100 cfm Bingham circulating pump, all of stainless steel construction.

A Foxboro automatic digester control system is employed and a push button station provides remote control of operations from chip feeders to the Yarway electrically operated digester blow valve.

Heat from the digester blow steam is recovered by the Rosenblad system. Flash steam from the blow tank is passed to a jet condenser using cooled condensate as the condensing medium. Hot condensate collected in an accumulator tank heats fresh water in two spiral heat exchangers.

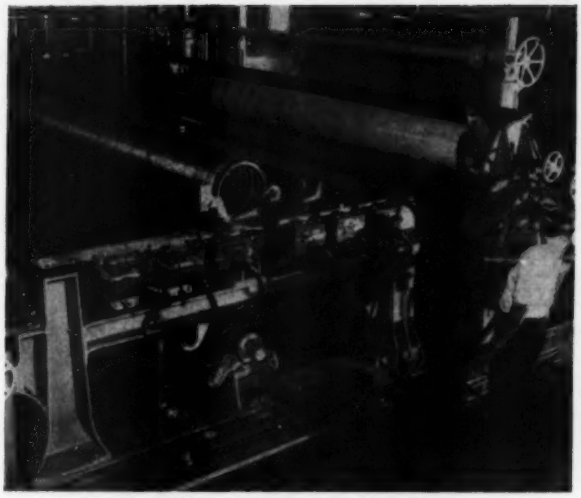
From the blow tank, which holds two digester batches, stock is pumped to the brown stock washing system. First, uncooked knots and other oversize materials are removed by Jonsson vibrating screens and are disintegrated by a Gruendler hammermill type knot crusher. This material, slushed with black liquor, is pumped back to the digesters.

With knots removed, the brown stock is washed in a conventional 3-stage system comprising three 8 x 14 ft. Sherbrooke washers with individual filtrate seal tanks and a foam tower with a centrifugal foam breaker.

Pulp storage at 12 per cent consistency

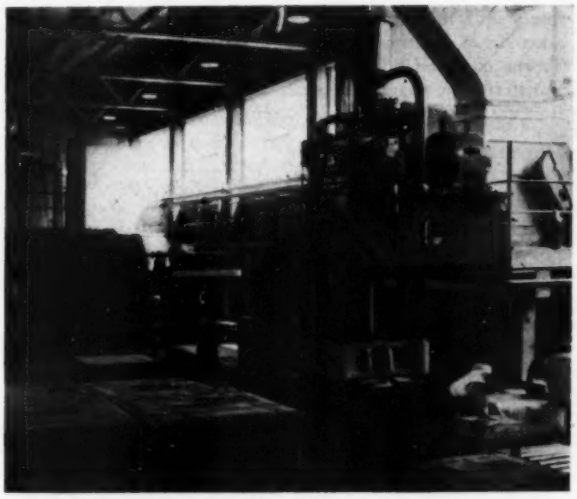
Thickened washed pulp from the final washer is not repulped but is sent by belt conveyor (Link-Belt) to the three high density storage tanks, each with a capacity of 20 tons of 12 per cent consistency pulp. These wood stave tanks are constructed of Douglas fir and are tapered, being 39 ft. high, 20 ft. dia. at top and 21 ft. dia. at the beginning of the steel cone shaped bottom. Stock is reclaimed from storage by diluting with water and pumping the slushed pulp to the flat screen headbox. A bottom entering agitator controls the dilution water valve to obtain a consistency of 2¾-3 per cent. Normal water pressure is 40-45 psi.

The unbleached stock screening system is made up of six lines of Watrous flat screens with Union screen plates arranged for primary, secondary and tailing operations. Accepted stock is thickened on a battery of four Sherbrooke deckers and goes to the unbleached decker chest. When the bleach plant is completed the pulp will go from the decker



Six suction boxes and suction couch on fourdrinier; dandy roll and two lump breaker type rolls compress sheet

Four Bingham vacuum pumps driven by G-E synchronous motors provide suction for wet-end water removal



Baldwin baling press compresses 40 inch high stack to 18 inches—bales weigh 500 lbs.

Clark fork trucks transfer pallets of pulp to warehouse or railroad car for shipment.

chest to the 8-stage bleaching system which will include a chlorine dioxide stage.

Filtrate tanks, blow tank, and most of the other steel tanks in the mill were fabricated by Dominion Bridge Co., Ltd. Wood stave tanks used for stock storage were built from lumber made by MacMillan sawmills. Throughout the mill wood stave pipe is used wherever possible in sizes 6 in. and over for water, white water, and stock lines. Most of the large stock valves were furnished by Crane. Except for the high density storage chests and the blending tank all stock chests as well as white water chests, wire pit and other vats and flumes are of concrete, Stebbins tile lined construction. A number of Shartle stock chest agitators were supplied by Alexander Fleck, Ltd. Most of the pumps throughout the mill, with the exception of the Worthington pumps used in the recovery and causticizing plant, were supplied by Bingham. Bulk of the electric motors were supplied by General Electric. Around 80 per cent of the control instruments are Foxboro.

Chemical recovery and liquor making

Weak black liquor from the first washing stage is concentrated in the 6-body 6-effect long tube John Inglis evaporator equipped with stainless steel tubes in the first effect. The black liquor is further concentrated in a Murray cascade evaporator and is then mixed with salt cake makeup before going through the liquor heaters ahead of the recovery furnace. Salt cake and sulphur for chemical makeup are received by car and stored in concrete silos. A Chain Belt Co. conveyor system is employed.

Concentrated black liquor is then burned in a Combustion Engineering recovery furnace designed for handling 770,400 lb. of dry solids per 24 hrs. Molten chemicals flow by gravity to the dissolving tank where, with weak wash water, it dissolves to form unclarified green liquor.

Flue gases from the recovery furnace contain chemical dust which is removed by passing the gases through a Cottrell precipitator supplied by the Precipitator Company of Canada. Recovered dust is returned dry to a mixing tank where it is mixed with black liquor ahead of the cascade evaporator.

Green liquor from the smelt dissolver is recausticized to white liquor in a conventional Dorr continuous system. Equipment includes a lime slaker, green liquor clarifier, 3-stage causticizing unit, white liquor clarifier, dregs washer and lime mud washer.

Lime mud is washed and dewatered on an Oliver rotary vacuum filter with a Nash vacuum pump before discharging

H. R. MacMILLAN EXPORT COMPANY, LIMITED

Operations and Products

Founded in 1919 as a merchandising company, the H. R. MacMillan Export Co., Ltd., Vancouver, B. C., Canada, later expanded until now it engages in the functions of timber holding, logging operations, manufacture of lumber, plywood, doors and other remanufactured wood products, sulphate pulp manufacture, and carries on its shipping and selling activities.

Owners, Directors and Officers

Owners—The company is owned by about 3300 stockholders, many of whom are officers and employees. Approximately 68 per cent of the shareholders are residents of British Columbia.

Directors—E. B. Ballentine, D. A. Baxter, J. M. Buchanan, M. Collins, D. Dewar, G. Farrell, B. M. Hoffmeister, H. H. Wallace, J. Lecky, H. R. MacMillan, H. T. Mitchell, H. G. Munro, L. R. Scott, R. M. Shaw, W. J. VanDusen.

Officers—H. R. MacMillan, chairman of the board; W. J. VanDusen, vice-chairman; B. M. Hoffmeister, president; R. M. Shaw, vice-president; G. D. Eccott, secretary and treasurer.

Supervisory Officers—H. S. Berryman, general manager of production; D. McColl, manager of logging; A. C. Kennedy, manager industrial relations division; J. H. Sheridan, manager U. S. sales section; J. A. Johannson, manager Canada sales section; K. C. McIntyre, manager overseas sales section.

Divisions and Subsidiaries

Production—Alberni Pacific Lumber Division and Alberni Plywoods Division, Port Alberni, Vancouver Island, J. S. Johannson, general manager; Canadian White Pine Division and MacMillan Industries Division, Vancouver, J. C. Ramsay, gen. mgr.; Kennedy Lake Logging Co., Ltd., Ucluelet, V. I., K. T. Baird, mgr.; Northwest Bay Logging Division, Northwest Bay, V. I., F. W. Fearman Jr., mgr.; Pulp Division, Nanaimo, V. I., C. Crispin, mgr.; St. Vincent Bay Division, Jervis Inlet, F. Kuchinka, mgr.; Shawnigan Lake Lumber Division, Deerholme, V. I., G. E. Wellburn, mgr.; Victoria Lumber Division, Chemainus, V. I., E. G. Shorter, gen. mgr.

Supply—Timber Division, Vancouver, D. K. Shaw, mgr.; Log Supply Division, Vancouver, J. D. Sexton, mgr.

Shipping—Canadian Transport Co. Ltd., Vancouver, H. F. Jones, mgr.

Sales—Principal offices in the following cities: Montreal and Quebec City, J. E. Green, mgr.; Toronto and London, Ont., V. B. Moore, mgr.; Winnipeg, E. R. Moorhouse, mgr.; Edmonton, G. E. H. Heaps, mgr.; New York, P. W. Lamont, mgr.; Portland and Seattle, C. A. Woods, mgr.

---

into the 7 x 250 ft. Traylor rotary kiln equipped with Leeds & Northrup temperature control. Makeup lime for the system is supplied by the addition of lime rock to the kiln feed. Hot lime is transferred to storage by a Chain Belt Co. conveyor system.

Pulp forming and drying

From the unbleached decker chest stock is pumped to a 25-ton capacity blending tank of wood stave construction with a tile-concrete cone bottom. The tank is 38 ft. ID x 30 ft. high and is equipped with a two propeller top entering agitator. Stock is pumped direct to the fan pump on the pulp machine. Stock to the machine is controlled manually or by the Toledo automatic sheet weighing unit installed between the press section and the Flakt dryer.

Pulp is formed in a sheet on a fourdrinier wet end and press section (John Inglis Co.) and is dried in a Flakt dryer. (Paper Machinery Co. Ltd.) operating at 100-110 fpm. The fourdrinier wire is 178 inches wide by 80 ft. long and runs over 26—7 inch rubber covered tube rolls, six oscillating suction boxes, and a 36 inch dia. couch roll with a double suction box arrangement. It is equipped with a dandy roll and two rubber covered lump breaker type rolls and with stainless steel saveall pans. Lodding doctors are installed on the breast roll, return wire rolls, etc. The machine is equipped throughout with SKF antifriction bearings.

The formed sheet leaving the couch roll is passed through two main presses then over two steam heated predryer rolls, and through the third main press before it enters the dryer. All presses are loaded with pneumatic cylinders automatically controlled with Foxboro instruments. Top press rolls are bronze and are equipped with Lodding oscillating doctors. Bottom press rolls are rubber covered as are all felt rolls. Each press felt is kept clean with a shower and suction box.

Vacuum for suction boxes and suction couch is supplied by four Bingham vacuum pumps driven by direct coupled G-E 125 hp synchronous motors.

From the press section the sheet enters the bottom conveyor of the 13 deck 133 ft. long Flakt hot air dryer equipped with Mason Neilan controls. Each horizontal conveyor is separated from the others by steam coils. A battery of 18 circulating fans is installed on each side of the drying chamber about midway between the wet and dry end to provide forced air circulation. Retention time of the sheet in the dryer is about ½ hr. The machine is powered by a Harland sectional electric drive with individually controlled motors for each section of the machine.

The dry sheet emerges from the top deck of the dryer to a heavy duty cutter, automatic layboy and conveyors built by the Lamb-Grays Harbor Co., Inc. Piles of cut sheets on the layboy belt conveyor are transferred to the belt conveyor on a movable platform which swings through a quarter circle and then sends the stacked sheets to the Toledo platform scale ahead of the baling press conveyor. The 800-ton Baldwin hydraulic press compresses the 40 inch high stacks of cut sheets into 18 inch high bales weighing 500 lb. Bales are taken from the conveyor by an electrically operated Yale & Towne monorail hoist and loaded on pallets which are then transferred by Clark fork trucks to the warehouse or to railroad cars for shipment.

Steam and power

Steam for the mill is generated by the recovery boiler and by two power boilers burning hog fuel. All three units were built by Combustion Engineering Co., Ltd. Each of the two power boilers is equipped with a Bigelow-Liptak dutch oven for hog fuel firing. The grate area is divided into three cells with division walls between them. Each cell is separately fired through one feed hole in the roof by chute from an overhead flight conveyor.

The recovery boiler produces about 120,000 lb. per hr. of steam and the two power boilers have a combined maximum capacity of 150,000 lb. per hr. when firing hog fuel. Steam atomized oil burners are installed on the boilers for emergency use.

The boiler house and recovery room are located adjacent to one another and have a common operating floor. They use the same feedwater system, blow off tank and steam header. A Hays combustion control system together with Bailey meters are employed by the hog fuel boilers.

Electrical energy is purchased from the B. C. Power Commission's hydroelectric development at Campbell River. It is transmitted to the mill at 60 kv. and delivered to the mill system at 13.8 kv. Three 13.8 kv. feeders each serve a single step down substation. Each substation will accommodate up to three 1500 kv-a, 3 phase transformers. One additional 13.8 kv. feeder circuit supplies power to the water pump station.

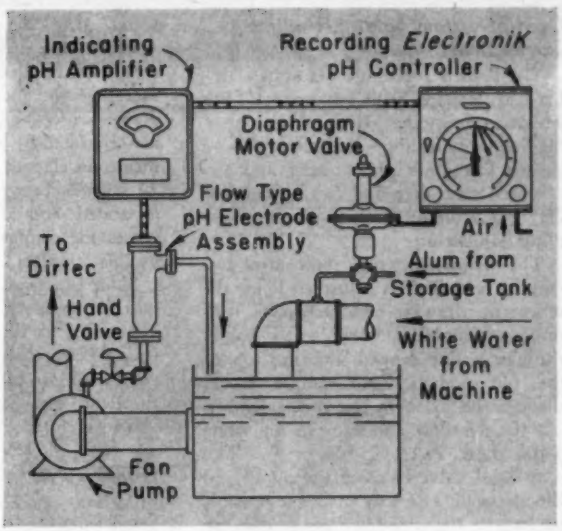
Water supply

Mill requirements of about 23,000,000 gal. per day of water are obtained by use of Ranney collectors. An underground reservoir of water bearing gravel about six miles south of the mill has been tapped by two such installations.

Each of the Ranney wells consists of a cement caisson, 16 ft. in diameter, sunk 85 ft. in the ground. Near the bottom a series of perforated pipes extend out laterally an average of 150 ft. into the water bearing formation like spokes in a wheel. A battery of Byron Jackson deep well pumps at the top of the caisson draws water from the well and pumps it into the 40 inch diameter wood stave pipe line. Surge and storage tanks at intervals in the six mile pipe line help maintain a constant pressure at the mill.

Automatic pH control improves quality at Newton Falls

J. W. MORROW[1] and J. E. SHEPARD[2]



Brown pH control system at Newton Falls—Beckman electrode assembly and indicating amplifier, Brown ElectroniK pH controller, Conoflow control valve

▶▶▶ MORE UNIFORM SIZING and better working of the stock in the jordan are some of the advantages realized through the application of automatic *p*H control to one fourdrinier machine (and soon to be applied to a second machine) at the Newton Falls Paper Co., Newton Falls, N.Y. Since this mill produces premium grades of paper—such as coating raw stock, magazine paper, coated offset, coated label, machine finished offset, tablet and envelope—it is essential that close quality control be observed at every step from the laboratory to the finished reel of paper. Consequently, use is made of every available tool which will help in maintaining the high standards of quality for which the mill is known.

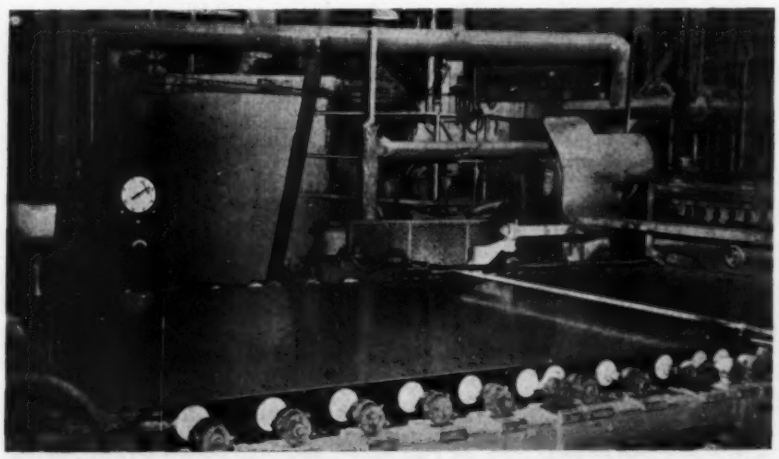
Sizing uniformity critical in coating operation

When a sheet is to be coated, variations in sizing uniformity will result in accompanying variations in the manner in which the sheet takes the coating when run through the coater. This results in a sheet of variable quality leaving the super-calender. For this reason, control of sizing uniformity is an important phase of over-all mill quality control.

Studies conducted at the Newton Falls mill confirmed the theory that small variations in the *p*H of the stock going on the wire made appreciable changes in the sizing uniformity of the finished sheet. For example, it was found that on one grade of paper a change in *p*H from 4.7 to 4.5 caused a noticeable improvement in sizing uniformity. Moreover, the effect of *p*H is of equal importance whether the size is added in the beater or the sheet is tub sized on the machine. For best results, the *p*H should be controlled to within ± 0.1.

In order to obtain sufficiently close control, it was decided to add only half of the reagent (alum in this case) prior to the jordan, the remainder (known as control alum) being added by means of automatic control at some point following the jordan.

(1) Technical director, Newton Falls Paper Co., Newton Falls, N. Y., (2) Field engineer, Minneapolis Honeywell Regulator Co., Industrial Div., Philadelphia.



Automatic pH control on fourdrinier machine; controller and amplifier mounted in splashproof cubicle; holds pH within ± 0.1

Beckman flow-type electrode assembly continuously samples pH of white water

Control system holds pH within narrow limits

The Brown automatic *p*H system utilized at Newton Falls comprises (1) a Beckman flow type *p*H electrode assembly and indicating amplifier, (2) a Brown Electronik *p*H recorder and air-operated controller, and (3) a Conoflow diaphragm motor control valve for handling liquid alum.

The manner in which the control system is installed is illustrated in the schematic drawing. As shown, a continuous sample of white water passes through a line tapped into the top of the fan pump. This sample moves through the flow type electrode assembly, out the overflow and back to the white water chest.

A hand valve between the pump and the electrode assembly makes it possible to isolate the assembly from the fan pump when necessary to inspect or replace the electrodes. Sensitive electrodes in the flow assembly immediately detect any variations in the *p*H of the white water and transmit these variations electrically through an indicating amplifier to the recording controller. Although in the drawing the amplifier and recorder are shown as separately mounted, actually they are both installed in a splash-proof steel cubicle as illustrated.

An air-operated valve actuated by the control instrument regulates the addition of alum to the white water at a point just after it leaves the white water tray on the paper machine.

Illustrative of the high speed of response of the ElectroniK controller is the fact that the points where the control alum is added and the *p*H is measured are separated by only about 20 feet. This means an elapsed time of not more than 20 seconds between the time the alum is added and the electrode assembly senses the change in *p*H brought about by this addition.

Since practically all of the water put into the sheet before it goes on the wire is handled by the fan pump into which the *p*H electrode assembly is tapped, control of *p*H at this point provides an excellent means of obtaining correct sheet *p*H.

Proper valve sizing essential

Although much thought is usually given to the accuracy and sensitivity of a control instrument, the importance of the final control element, in this case a diaphragm motor valve in the alum feed line, is sometimes overlooked. Experience at Newton Falls showed that the use of a valve which was slightly oversized could cause the *p*H to cycle as much as ± 0.4.

The reason for such cycling is fairly obvious since the sizing of a valve determines the amount of fluid which will be passed through it for any given amount of valve opening. If a valve which passes one gallon per minute when half open is used on a control application calling for a valve passing half a gallon a minute when half open, it will be impossible for the most accurate instrument to provide precise control. When controlling a variable such as *p*H to within ± 0.1 of a unit, correct valve sizing is a factor of major importance.

Improves Quality—Cuts Costs

Close quality control maintained by numerous laboratory checks made at many stages of the manufacturing process at the Newton Falls mill have narrowed down the advantages gained from *p*H control to (1) better sizing uniformity, and (2) better working of the stock in the jordans.

For example, the amount of alum added in the beaters is carefully measured for each batch. In mills where such care is not taken, it is often the practice to add an excess of alum to be sure to have enough. When automatic *p*H control is applied in a mill of this type, sizable savings in alum invariably result.

Mills running colored paper in various shades find that maintaining the same sheet *p*H on duplicate runs aids materially in reproducing the desired shades.

In general, the benefits obtainable from automatic *p*H control depend largely upon (1) types of paper or board produced, (2) degree of quality desired in the finished sheet, and (3) degree of control exercised at various stages of the manufacturing process.

Manufacture of cellulose pulps from straw

S. I. ARONOVSKY[1]

▶▶▶ STRAW PULP is an important ingredient of paper and board in all countries where straw is grown and where paper and board are produced. Bleached straw pulp is blended with wood and rag pulps for many grades of fine paper and board, particularly in Europe and South America. In North America only the coarse type of straw pulp, with one exception, is currently produced, mainly for making corrugating paper although small amounts are also used for straw chip, shirt board, egg case fillers, and similar products. The exception is a small amount of unbleached or semibleached chemical wheat straw pulp for brown cigarette paper for the Central and South American trade. White cigarette paper is made in America almost entirely from seed flax tow which constitutes about 20-25 per cent by weight of seed flax straw.

History

Cereal grain straws are among the oldest of papermaking materials. Use of straw for paper, along with bamboo and rags, dates back to the early Chinese era of papermaking. The straws and other papermaking materials were generally defibered by softening in water and then macerated by hand or, later, by stamping machines. The pulps so produced were diluted and made into sheets of paper on hand molds. The wet sheets were allowed to dry in the air and sun.

The first chemical straw pulp was produced in 1800 by Mathias Koops from Mainz, Germany, and the first commercially successful straw pulp process took place at Chambersburg, Pa., in 1831 producing binder board on a cylinder machine at the rate of 100 pounds per hour. Bleached straw paper was first produced by John B. Davis at Rensselaer, N.Y.

In the early days of its manufacture, straw paper was widely used for wrapping meats and was not replaced as butcher paper until the early part of this century. Newsprint was produced from straw pulp mixed with rag and other available waste fibrous materials. The stronger types of papers were made from a mixture of straw pulps with those made from rags, rope, or bagging.

Straw, rags, and other available waste fibrous products continued as the raw materials for paper until about 1860 when commercial production of wood pulp began. The rapid expansion of wood pulp production supplanted the use of straw, particularly in the United States, for practically all types of paper except corrugating paper. Some European countries, however, notably Holland, Germany, France, and Italy, have continued to produce and use straw pulp for fine papers and boards as well as for the coarser grades. Argentina, Italy, Holland, and other countries which must import pulp-

(Turn to page 650)

(1) Prepared at the invitation of the VIII International Congress of Agricultural Industries by Dr. S. I. Aronovsky, in charge, Pulp and Paper Section, Agricultural Residues Division, Northern Regional Research Laboratory, Peoria, Ill., U.S.A., one of the laboratories of the Bureau of Agricultural and Industrial Chemistry; read before this Congress July 9-15, 1950, at Brussels, Belgium, by Dr. G. E. Hilbert, chief, Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, United States Department of Agriculture, Washington, D. C.

PAPER SKETCHES

BEFORE coming to this country to become America's first papermaker, the German, William Rittenhouse, became a Dutch citizen at Amsterdam, Holland.

ALTHOUGH he succeeded in converting straw into pulp in 1854, it took the Frenchman, A. C. Mellier, three years to convince a single American papermaker that the process was practical.

First Chinese papermaking method was to pour pulp into bamboo-framed, woven cloth molds —then let the paper dry on the molds.

THE SOUTH today turns out more than one-half the pulp made in the United States. This is four times the amount this section produced 15 years ago.

The Paper Industry Association News

Weatherproof Fiber Box Group Is New Association

At a meeting held at the Blackstone Hotel, Chicago, recently producers of corrugated and solid fiber containers formed an organization to be known as the Weatherproof Fiber Box Group. The new association, open to all producers of such containers, will be a voluntary, unincorporated association not for profit. Chosen chairman of the group at the meeting is John V. Spachner, executive vice president of Container Corporation of America, Chicago. Two vice chairmen will be elected and operating committees appointed at the next meeting, scheduled for September 19.

The new group was formed when members of the industry decided that it was desirable and necessary to organize such an association to expedite the production and delivery of fiber boxes in the quantities needed by the military and other departments of the government, during the present emergency. Members of the group believe that through voluntary action, including conference with military and government officials, government requirements can be handled quickly and correctly.

TAPPI's Fibrous Agric. Residue Comm. Announces Meeting at Peoria Lab.

Papers are being solicited for presentation at the 1950 fall conference of the Fibrous Agricultural Residue Committee of the Technical Association of the Pulp and Paper Industry, to be held November 13 and 14 at the Northern Regional Research Laboratory, Peoria, Ill. S. I. Aronovsky, chairman of the committee, has announced that papers are needed on washing, screening, refining and other phases of strawboard production; such papers should be about 10 minutes in length, so that time may be allowed for full discussions following presentation.

Plans made for the meeting thus far schedule Monday, November 13, for the conference on strawboard, and Tuesday, November 14, for a meeting of the Fibrous Agricultural Residues Committee and visits to plants in the Chicago area.

The two-day conference will include a social hour and group dinner on Monday evening, November 13, at the Blue Ribbon Hall of the Pabst Brewing Co., Peoria Heights, at which time a prominent speaker will address the group. The small registration fee which will be charged to cover incidental expenses of the meeting will include the cost of this dinner.

Blocks of rooms have been reserved at the Pere Marquette Hotel in Peoria for November 12 and 13.

Season Schedules for Pacific Coast & Metro. Sections of TAPPI

A meeting of the executive committee of the *Metropolitan section of TAPPI* was held recently to set up committees and program for the coming year. Messrs. Reid, Butterworth, Perry and Willets were present.

Chairmen appointed for 1950-51 include W. R. Willets, program committee; E. P. McGinn, publicity committee; and William Landes, membership committee.

The tentative program for the year is:

September 12—Development of new papers by the use of new chemicals.

October 10—Effect of present political and economic trends on our industry.

November 14—Technical problems of the newspaper industry.

January 9—New ideas in the use of paper for automatic packaging.

March 6—Use of paper by business.

April 3—Machinery innovations in the industry—new methods of refining, new paper machines, etc.

May 1—Annual meeting program to be announced later.

Pacific Coast TAPPI also has announced its program for 1950-51. The following meetings will open at two o'clock in the afternoon, and will be followed by dinner.

September 13—Seattle, Washington—Pulp purification.

September 13-14—Seattle, Washington—TAPPI seminar for advanced study conducted by Dr. J. A. Van den Akker, Institute of Paper Chemistry, on "Application of physics to the processes of pulp and paper."

November 7—Camas, Wash., Printing and printing papers.

February 6—Olympia, Wash., Annual engineering meeting.

April 13—Longview, Wash., Annual meeting and annual Shibley Award contest.

Coming Events

Sept. 11-23—[illegible]th Educational Graphic Arts Exposition, to be held at the International Amphitheatre, Chicago.

Sept. 13-15—Second TAPPI Testing Division Conference, to be held at Eastman Kodak Co. plant, Rochester, N.Y.

Sept. 15-16—Annual Fall Meeting of Northwestern Division of the Superintendents Association, at the Schroeder Hotel, Milwaukee, Wis.

Sept. 18-22—Fifth annual Instrument Conference and exhibit, sponsored by Instrument Society of America, Memorial Auditorium, Buffalo, N.Y.

Sept. 21—First fall meeting of the Michigan Division of the Superintendents Association, to be held at Hotel Harris, Kalamazoo, Mich.

Sept. 21-23—Annual fall meeting of the Northeastern Division of the Superintendents Association, to be held at Poland Spring, Me.

Sept. 30—Connecticut Valley Division of the Superintendents Association will meet at Red Lion Inn, Stockbridge, Mass.

Oct. 2-5—Fifth annual TAPPI Engineering Conference, Netherlands Plaza Hotel, Cincinnati, O.

Oct. 10—Metropolitan Section of TAPPI conference on "Effect of present political and economic trends on our industry;" meeting place will be announced later.

Oct. 11-13—Fifth Annual Symposium on "Instrumentation for the Process Industries," to be held at the Agricultural and Mechanical College of Texas, College Station, Tex.

Oct. 12-14—Annual meeting Southern and Southeastern Div. of TAPPI, to be held at the George Vanderbilt hotel, Asheville, N. C.

Oct. 16-20—38th Annual Congress and Exposition of the National Safety Council, Stevens Hotel, Chicago.

Oct. 23-25—Fall Convention of the National Paper Trade Association, to be held at the Stevens hotel, Chicago.

Oct. 25-27—Alkaline Pulping Conference of TAPPI, at George Washington Hotel, Jacksonville, Fla.

Nov. 7—Pacific Coast section of TAPPI will meet at Camas, Wash., to discuss "Printing and printing papers."

Nov. 12-13—Fibrous Agricultural Residue Conference of TAPPI, at Peoria, Ill.

Nov. 27 - Dec. 2—Nineteenth National Exposition of Power and Mechanical Engineering, to be held in Grand Central Palace, New York.

Febr. 19-23, 1951—Paper Week, Annual meeting of the American Paper and Pulp Association and paper groups, at the Waldorf-Astoria Hotel, New York City.

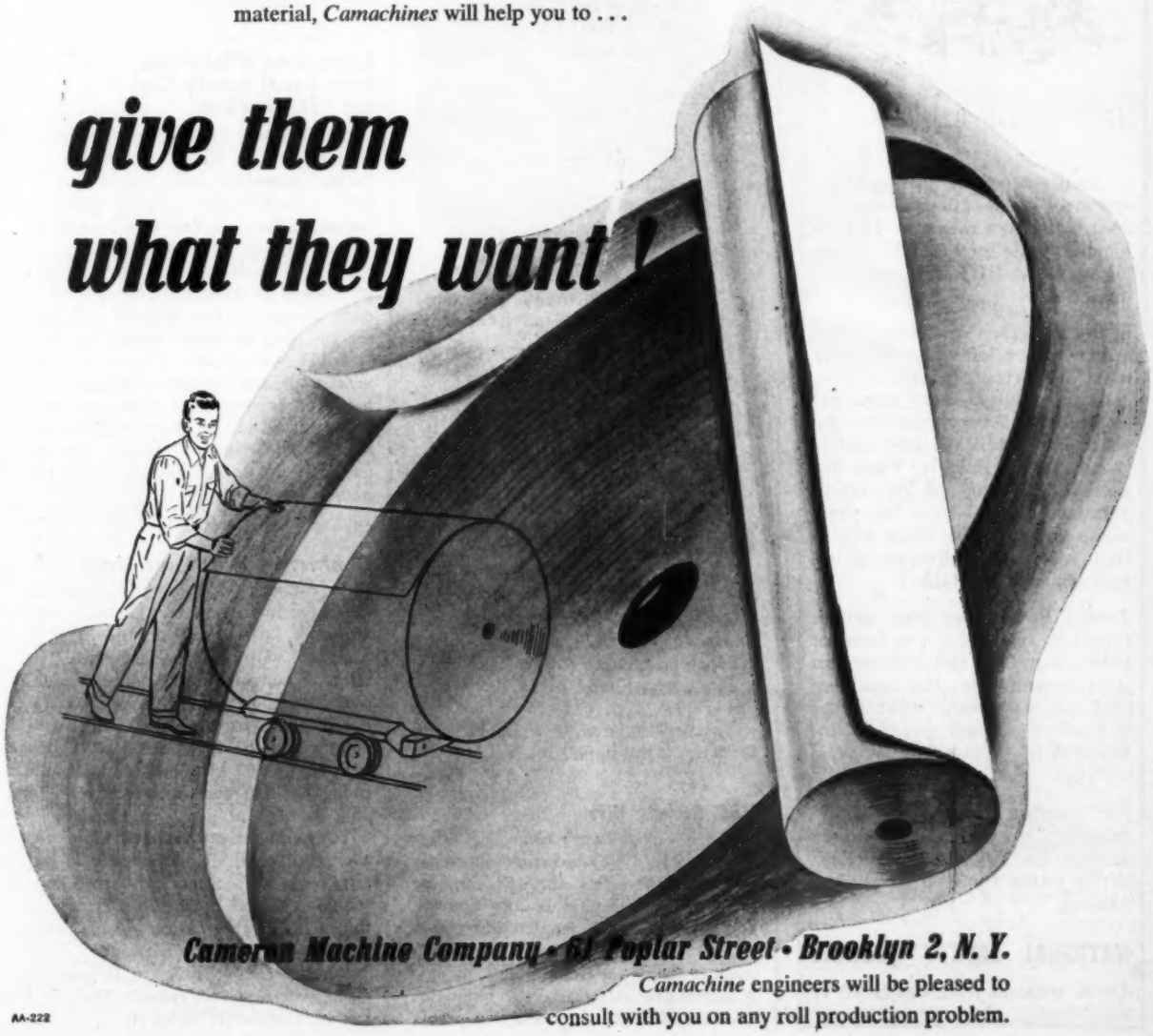
April 17-20, 1951—20th National Packaging Exposition of the American Management Association, to be held in Atlantic City, N.J.

New Camachines have the right answer to you. roll production problem. Whether it's a two-ton roll of newsprint or a half-ounce roll of plastic tape you give your customers better quality with *Camachine*-made rolls.

Camachines are designed and built by specialists in roll production equipment. No matter what material you handle you will be amazed by the performance of the new *Camachines*. Long rolls or thin rolls? Heavy or light? Paper, plastic, rubber or textile? Coated materials, tacky materials or materials of uneven caliper? When it comes to presenting your customers with better rolls of any size, any material, *Camachines* will help you to . . .

The Camachine Commander—a fast, heavy-duty slitter-rewinder for plain, waxed, gummed and coated paper or paper board. Speeds up to 2000 fpm. Rewound rolls up to 40″ dia. Write for free copy of Bulletin 2000.

give them what they want!



Cameron Machine Company • 61 Poplar Street • Brooklyn 2, N. Y.

Camachine engineers will be pleased to consult with you on any roll production problem.

AA-222

THE

BIGGEST

THING IN SAFETY

. . . that's what the Jumbo Posters are. These giant-sized billboard displays measure 11 feet 8 inches wide by 9 feet 11 inches high . . . so BIG they can't be missed!

Many people in your plant aren't aware of some of your most important safety work—essential measures not apparent to the eye. Everybody, on the other hand, can see and understand Jumbo Posters. They are an effective way of reminding your associates—from the president down to the office boy—that safety is a live-and-going concern in your plant.

Jumbo Posters are good public relations, too. Set out in front of your plant, they tell everyone in your community—the residents and the passersby—that yours is a safety-minded company, interested in the welfare of your workers.

Let Jumbo Posters add showmanship to your plant safety and public relations programs. Write today for free illustrated catalog.

NATIONAL SAFETY COUNCIL

425 N. Michigan Ave., CHICAGO 11

The Paper Industry Safety News

Pulp and Paper Section Has Planned Big Program for NSC 1950 Congress

When the 38th annual safety congress meets in Chicago, October 16-20, the Pulp and Paper Section expects to present a program which probably will be the most outstanding in the Section's history. Chairman George W. Harper points out that the published program carries more general sessions than previous meetings.

Headquarters of the Congress will be in the Stevens Hotel where the Pulp and Paper Sessions will be held.

Program—Pulp and Paper Section

Monday, October 16 (2 p.m.)

Progress report, General Chairman, George W. Harper.

"Safety, a cornerstone of security," by Cola G. Parker, pres. Kimberly-Clark Corp.

Edward Benton Fritz Memorial Trophy presentation.

Nominating Committee Report and Election of Officers.

Tuesday, October 17 (2 p.m.)

"Safety as practiced in the container plant," by G. J. Bienvenu, gen. supt., Gaylor Container Corp. (Container Div.).

"A kit of tools," by R. W. Laughlin, supvr. Liberty Mutual Insurance Co.

"Safety around the paper mill," by Dwight J. Thomson, vice. pres. and dir. Industrial and Public Relations, Champion Paper & Fibre Co.

Safety and training film of the American Pulpwood Association.

Wednesday, October 18 (2 p.m.)

Round Table Discussions: (1) Sulphite Pulp Mfg., (2) Sulphate Pulp Mfg., (3) Paper Converting.

Thursday, October 19

Luncheon meeting (noon).

Afternoon—Round Table Discussions: (1) Paper Mfg., (2) Pulpwood Logging, co-operating with Wood Products Section, (3) Insulation Products.

NSC Safety Kits

The National Safety Council is offering a packaged kit which suggests means of promoting safety through contests, with cash prizes paid by the Council. Each kit contains a complete instruction booklet teaching management how to conduct safety contests in plants, monthly contest posters, streamers and bulletins for bulletin boards, reproduction proofs and mats for limerick contest cartoons, sample entry blank forms for contest, announcements for public address systems or house organs, and copy for letters and announcements.

The contest is related to safety calendars which are offered by the Council; each monthly sheet of the calendar has a human interest color painting and a limerick to be completed by contestants; prizes for the best last line of the current limerick are $100, $50, $25, and 30 prizes of $5. The Council assumes the cost of prizes, and the kit is free with orders for 200 or more calendars or for smaller quantity orders which represent a calendar for each employee.

Sutherland Wins Plaque from Local Safety Club for 1949 Record

A plaque was awarded to the Sutherland Paper Co., Kalamazoo, Mich., by the Kalamazoo Industrial Safety Club (a part of the Kalamazoo Safety Council) for establishing a safety record in 1949.

In accepting the plaque for his company, William Race, company president, gave credit for the record to Forrest Kimmell, company safety director. In 1949, the company not only bettered its 1948 record, but established a lost-time accident record of 6.94 per million man-hours of exposure. In 1948, the company's record was 20.19 per million man-hours. The national average for the paper industry in 1948 was 15.15 per million man-hours.

Contest at Half-Year Mark

At the end of the sixth month of the Paper Industry Safety Contest, there was very little change in the rates as compared with the previous month; this refers to both the monthly and cumulative rates. The six-month rate was reduced to 9.65 from 9.72 for the previous month, and the May rate of 8.71 was lowered to 8.62. In both instances, the change in the rate was a reduction of only one per cent.

The mid-point of the contest shows the average number of accidents is 14 per cent lower than the rate for the corresponding period last year. Decrease in the rates for the various groups range from 12 per cent to 25 per cent.

Reports ending June 30 showed 69 mills with a perfect record. Division I has 40; Division II shows 20.

Division I—Pulp and Paper

GROUP A (None)

GROUP B

Crown Zellerbach Corp. (La Tuque Can.) Port Townsend, Wash.

GROUP C

West Virginia Pulp and Paper Co., Williamsburg, Pa.
Mead Corp. (Heald Div.), Cincinnati, Ohio
St. Anne Paper Co., Beaupre, Canada
Johns-Manville Corp., Jarratt, Va.
Ruberoid Co., Gloucester, N.J.
Price Bros. & Co., Ltd., Jonquiere, P. Q., Canada
International Paper Co. (Southern Kraft. Div.) Mobile, Ala.
National Vulcanized Fibre Co., Yorklyn, Del.
Ruberoid Co., Erie, Pa.

GROUP D

Certain-teed Products Corp., E. St. Louis, Ill.
Certain-teed Products Corp., Port Wentworth, Ga.
Certain-teed Products Corp., York, Pa.
National Vulcanized Fibre Co., Newark, Del.
Certain-teed Products Corp., Richmond, Cal.
Philip Carey Co., Lennoxville, Que., Canada
U. S. Gypsum Co., Oakmont, Pa.
Hollingsworth-Whitney Co., Madison, Me.
Armstrong Cork Co., Pensacola, Fla.
Pacific Coast Paper Mills of Washington, Inc., Bellingham, Wash.
Lloyd A. Fry Roofing Co., Houston, Tex.
Lloyd A. Fry Roofing Co., Brookville, Ind.
Lloyd A. Fry Roofing Co., Memphis, Tenn.
National Gypsum Co., Kalamazoo, Mich.
U. S. Gypsum Co., N. Kansas City, Mo.
Certain-teed Products Corp., Marseilles, Ill.
Mead Corp., Nashville, Tenn.
American Writing Paper Corp. (Nonotuck Div.), Holyoke, Mass.
Spaulding Fibre Co., Milton, N.H.
Riegel Paper Corp., Hughesville, N.J.
National Gypsum Co., Newburgh, N.Y.
Volney Felt Mills, Fulton, N.Y.
Ruberoid Co., Dallas, Tex.
Volney Felt Mills, Inc., Mishawaka, Ind.
American Writing Paper Corp. (Mt. Tom Div.), Holyoke, Mass.
Kimberly-Clark Corp. of Canada, Kapuskasing, Canada
International Paper (Livermore Mill) Livermore, Me.
Spaulding Fibre Co. (Hayes Plant), No. Roctester, N.H.
Alton Box Board Co., Carlyle, Ill.
Ball Brothers Co., Noblesville, Ind.

Division II—Paper Converting

GROUP A

Scott Paper Co., Chester, Pa.

GROUP B

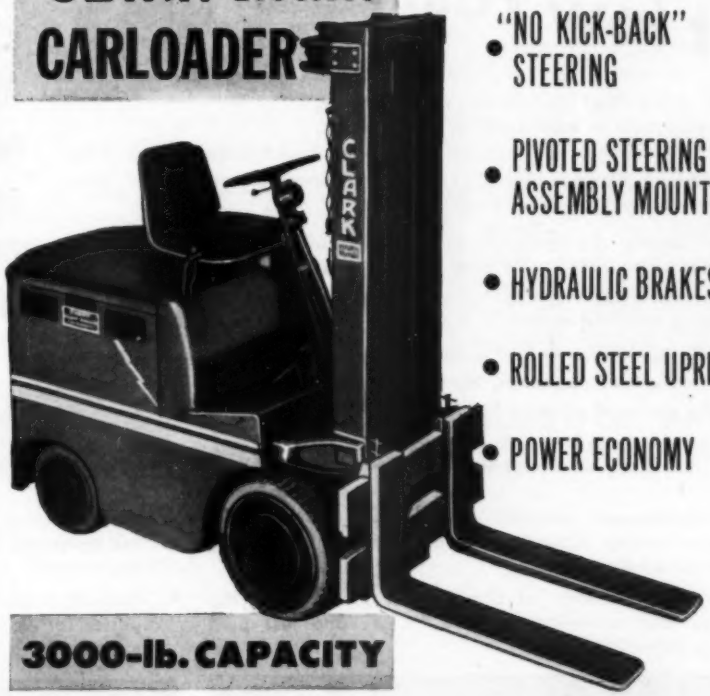
Old Colony Envelope Co., Westfield, Mass.
Container Corp. of America, Cleveland, Ohio
Hankins Container Co., Elizabeth, N.J.
Ohio Boxboard Co. (Container Div.), Rittman, Ohio

GROUP C

Bird and Son, Inc., Chicago, Ill.
Ft. Wayne Corrugated Paper Co., Pittsburgh, Pa.
Kimberly-Clark Corp., Appleton, Wis.
Marinette Paper Co., So. Glen Falls, N.Y.
St. Regis Paper Co., Nazareth, Pa.
Lily Tulip Cup Corp., Chicago, Ill.
Thilmany Pulp and Paper Co., Kaukauna, Wis.
Certain-teed Products Corp., Dallas, Tex.
Ft. Wayne Corrugated Paper Co., Rochester, N.Y.
St. Regis Paper Co., Ltd., Dryden, Ontario
St. Regis Paper Co. Watertown, N.Y.
Certain-teed Products Corp., Kansas City, Mo.
Container Corp. of America, Greensboro, N.C.
Lily Tulip Cup Corp., Galva, Ill.
Pillsbury Mills, Inc., Wellsburg, W. Va.
Container Corp. of America, Philadelphia, Pa.
Certain-teed Products Corp., Buffalo, N.Y.
Lily Tulip Cup Corp., French Lick, Ind.
Green Bay Box Co., Green Bay, Wis.
Great Southern Box Co., Inc., New Orleans, La.
Bay West Paper Co., Green Bay, Wis.
Flintkote Co., Hollywood, Cal.
Lloyd A. Fry Roofing Co., Minneapolis, Minn.
Lily Tulip Corp., Goodland, Ind.

EVERY TESTED, PRACTICAL FEATURE DEMANDED BY EXPERIENCED, cost conscious USERS IS BUILT INTO THIS

Entirely New CLARK Electric CARLOADER



3000-lb. CAPACITY

- AUTOMATIC ACCELERATION
- STEERING COLUMN DIRECTIONAL CONTROLS
- "DEAD-MAN" SAFETY CONTROLS
- "NO KICK-BACK" STEERING
- PIVOTED STEERING AXLE ASSEMBLY MOUNTING
- HYDRAULIC BRAKES
- ROLLED STEEL UPRIGHTS
- POWER ECONOMY
- 24-INCH LOAD CENTER RATING
- "HI-LO STACK" UPRIGHTS OPTIONAL

Increased Speed, Capacity... Compactness and Maneuverability

CLARK IS YOUR BEST BUY

For complete information concerning this important advancement in the science of modern low-cost materials-handling, fill in and mail this coupon.

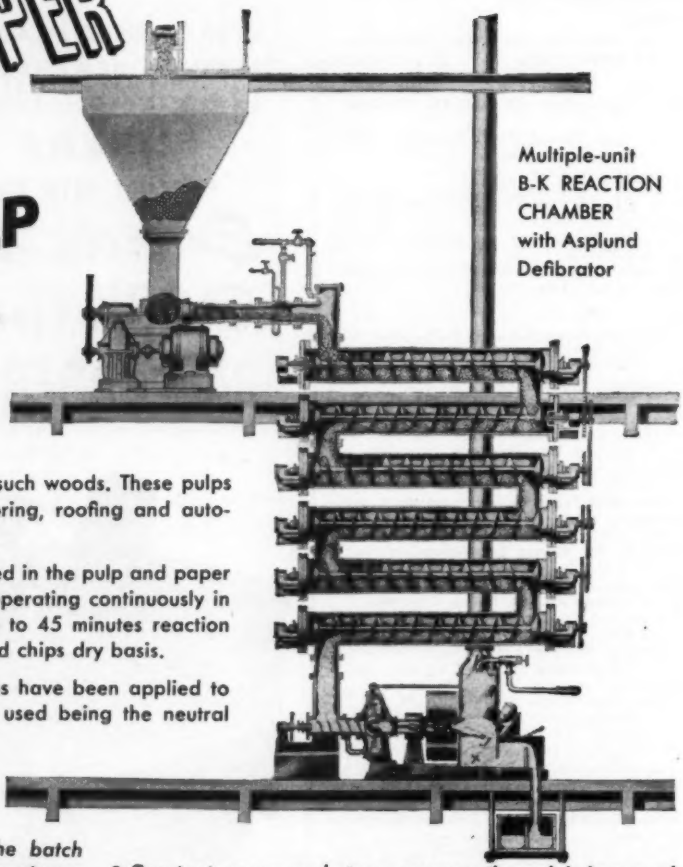
CLARK ELECTRIC AND GAS POWERED FORK TRUCKS AND INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BATTLE CREEK 22, MICH.
Please send: ☐ Elec-Carloader Literature ☐ Movie Digest ☐ Material Handling News
Name_____
Firm Name_____
Street_____
City_____ Zone____ State_____
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN PRINCIPAL LOCATIONS

CHEMIPULPER

(Patented and Patents Pending)

PRODUCES UNIFORM PULP at low cost . . .



Multiple-unit B-K REACTION CHAMBER with Asplund Defibrator

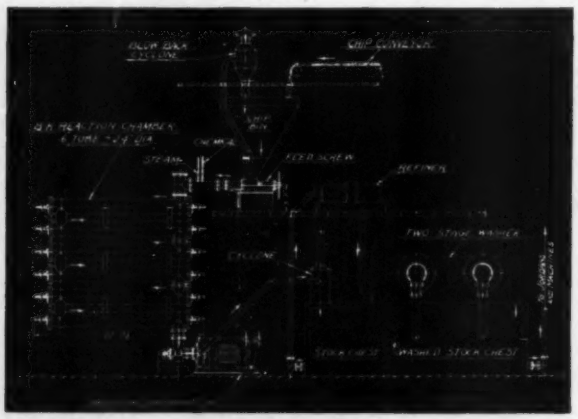
The Chemipulper produces, continuously, grades of pulp to meet specific requirements, using either hard or soft woods, or mixtures of such woods. These pulps are used for making .009 for corrugating; flooring, roofing and automotive felts, and insulating board.

More than fifty operating units have been installed in the pulp and paper industry . . . units built with from 2 to 8 tubes, operating continuously in 150 to 175 p.s.i. steam pressure range; from 4 to 45 minutes reaction time, and handling up to 100 tons a day of wood chips dry basis.

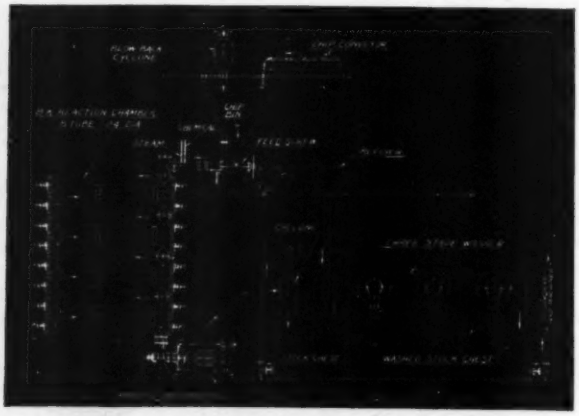
Several chemical agents of varied concentrations have been applied to the Chemipulper operation, the most generally used being the neutral sulphite and kraft cooking liquors.

Write for new Bulletin C2

- *The Chemipulper operation as compared to the batch digester usually shows a substantial saving in steam, power and labor costs.*
- *Continuous operation of Chemipulper means less chip storage and conveying equipment . . . and less pulp storage capacity.*
- *Constant power and steam consumption minimizes peak loads.*
- *Chemipulper space requirements are less than the batch digester for equivalent production capacity, thereby reducing building costs.*



Flow drawing of the CHEMIPULPER with auxiliary equipment for producing semi-chemical pulps for Corrugating Board.



Flow drawing of the CHEMIPULPER with auxiliary equipment for producing semi-chemical Neutral Sulphite and Kraft Pulps.

PAPER and INDUSTRIAL APPLIANCES, INC.
122 EAST 42 nd STREET ● NEW YORK 17, N. Y.

The Paper Industry Names in the News

Wm. Kosicki Appointed by Scott to Plant Engr. Post at Marinette Mill

Upon the recent resignation of Frans Janson as plant engineer of the Marinette Paper Co., Marinette, Wis., William Kosicki was appointed to the position.

Mr. Kosicki, for the past year a member of the engineering department of the Chester, Pa., mill of Marinette's parent company, Scott Paper Co., had formerly been a sales engineer for the Newport News Shipping and Drydock Co., Newport News, Va. Additionally, he was for a number of years associated with the design of yankee dryers and other papermaking equipment made at Newport News; in this capacity Mr. Kosicki was the shipyard's contact man for Scott Paper Co.

Wm. Kosicki

G. E. Gunderson

New Company Official Chosen by Brad Foote Gear Works

At a meeting of the board of directors of Brad Foote Gear Works, Chicago, held recently, Gunner E. Gunderson was named president of the company. Mr. Gunderson, who was formerly a vice president, has been with the company since its inception in 1924.

At the same meeting, E. J. Lingren, associated with the firm for the past 17 years, was elected a vice president, and H. J. Buescher, allied with Brad Foote since 1928, was chosen secretary-treasurer.

Pennsalt Changes

Two men have been appointed district sales managers for the heavy chemicals department of the Pennsylvania Salt Manufacturing Co., Philadelphia. George D. Grogan, formerly a product supervisor in the Philadelphia office, has been given the Chicago territory, while Donald Macfarlan, Jr., formerly a sales representative in the Paterson, N.J., office, has been assigned to the Detroit office.

Concurrently, several other personnel changes have been made. H. G. Potts, formerly district sales manager in Detroit, has been named supervisor of technical service for the Midwest areas. H. A. Smith, formerly district manager in Chicago, has been given special assignments in the heavy chemical field in Chicago.

L. H. Brandt has been appointed product supervisor in the Philadelphia office; A. C. Jones and Miss E. M. DeHaas have been appointed assistant product supervisors. Sales Engineers C. M. Fehr and V. C. Lane have been assigned all technical service work in the Philadelphia, Paterson, Pittsburgh and Cincinnati districts, while H. R. Bishop, formerly a sales representative in Chicago, has been transferred to a similar post in the Paterson office.

Stompe Leaves Marathon— Will Head Sales Dept. at Diamond Match

Upon his recent resignation as general sales manager of Marathon Corp., Menasha, Wis., Albert W. Stompe assumed new work as head of the sales department of Diamond Match Co., New York, Mr. Stompe, who had been general sales manager of Marathon since 1946, joined the firm in 1927 as a salesman and has held positions of increasing responsibility there since that time.

For many years Mr. Stompe, chairman of the Paper Napkin Association, served on the board of governors of the American Paper and Pulp Association. Although his new position will necessitate making business headquarters in New York, Mr. Stompe will undoubtedly continue his work with both groups.

Albert W. Stompe

E. R. Van Meter

Three Changes at Continental Can Co. Result From Newly Formed Paper Sections

Two executive promotions and an election to office have been announced at Continental Can Co., New York, by General Lucius D. Clay, chairman of the board. E. R. Van Meter, formerly sales manager of the Paper Container Section, has been named general manager of the newly created Paper Container Division. In his new post Mr. Van Meter will be responsible for both the manufacture and sale of paper cans, cups, and food containers.

Concurrently, Charles E. Eggerss has been elected vice president of the newly

Dr. Paul E. Burchfield Succeeds Johnson at Wyandotte

Charles S. Johnson (R), who has been director of technical service, Wyandotte Chemicals Corp., Michigan Alkali Div., Wyandotte, Mich., since 1939, is retiring from active service. He will, however, continue to serve the company in an advisory capacity. Dr. Paul E. Burchfield (L), assistant director of the technical service department since 1946, succeeds Mr. Johnson. Dr. Burchfield will continue contacts made by him with all of the industries served by Wyandotte. He is a member of several professional associations including the American Chemical Society and TAPPI. Dr. Burchfield also has contributed widely to the trade literature.

created Fibre Drum Division of the company, Mr. Eggerss, formerly general sales manager of the firm's Paper Converting Division, is a veteran of forty years experience in the paper box and fiber drum field. He came to Continental in 1942 when the company absorbed The Container Co., Van Wert, Ohio, of which Mr. Eggerss was vice president and sales manager.

C. E. Eggerss

Harry A. Kirk

The former regional sales manager in charge of Continental's paper container sales in the Pacific Division, Harry A. Kirk, has assumed the post of manager of sales of the Paper Container Division.

Four Changes at Hooker

Organizational changes involving four technical executives have been effected by Hooker Electrochemical Co., Niagara Falls, N.Y. A former research chemist and supervisor, J. E. Beanblossom, has been made manager of development. In his new work, Mr. Beanblossom will have charge of pilot plant operations, research manufacturing and research engineering.

James S. Sconce, former research chemist and research supervisor with Hooker since 1930, has been made manager of research. Mr. Sconce's partner in former supervision of research fellowships, Dr. Bruno J. Wojcik, has been named assistant to the technical superintendent. Dr. Wojcik will be responsible for all technical problems relating to product quality and improvement.

The new supervisor of technical sales service, J. S. Walker, came to Hooker in 1940, and since has been engaged in research and plant operations. In his new work, Mr. Walker will be in charge of technical service relating to the packaging, handling, and shipping of Hooker products.

Adams, Vietze and Anderson Given Appointments by Bird & Son, Inc.

Three executive appointments were made in July at Bird & Son, Inc., East Walpole, Mass. Filling the vacancy left with the recent passing of Dr. Samuel G. Trepp, (See Necrology) Daniel O. Adams was named chief chemist of Bird's Research Division. Dr. Adams joined the Research Department in 1948 as a research chemist in the Paper Research Laboratory, and was made assistant chief chemist in 1949.

Frank H. Vietze, who first joined Bird in 1921, has been named assistant auditor of the company, replacing Wesley A. Beaulieu whose retirement from the company came after thirty-three years of service. Mr. Vietze was previously head of the General Accounting Department.

Succeeding Mr. Vietze as head of the General Accounting Department is Roger W. Anderson, associated with the firm since 1941.

Gerald Twist Elected a Veep of FMC Corp.

At a director's meeting held late in July by Food Machinery and Chemical Corp., San Jose, Calif., Gerald F. Twist was elected a vice president of the corporation. Mr. Twist, presently manager of the firm's Peerless Pump Division, became associated with Food Machinery immediately upon his graduation from Stanford University in 1930. Some years later Mr. Twist left Food Machinery to go to Atlas Imperial Diesel Engine Co., Oakland, Calif., where he eventually became an executive vice president and director.

Mr. Twist rejoined Food Machinery in 1947, taking charge of the firm's newly-acquired subsidiary, Stokes and Smith Co., Philadelphia; two years later he was made manager of the Peerless Pump Division.

Gerald F. Twist

V. S. Risley, Jr.

Victor S. Risley, Jr. To Represent Morey on West Coast

The new West coast representative of Morey Paper Mill Supply Co., Fitchburg, Mass., is Victor S. Risley, Jr., who comes to Morey directly from his recent graduation from college.

For some little time, Mr. Risley will work directly with his grandfather, Jack E. Johnson, who has been Morey's West coast representative for many years. After his grandson is trained in the work, Mr. Johnson will devote his full time to other commitments in the papermaking field.

Miscall Joins Asten-Hill —Ken Hay Transferred

After operating his own business for a time, Darwin Miscall has joined Asten-Hill Manufacturing Co., Philadelphia. Mr. Miscall will be the firm's sales representative in Delaware, Maryland, New Jersey, Ohio, Pennsylvania, Virginia and West Virginia.

Darwin Miscall

Ken Hay

Mr. Miscall, a graduate of Cornell University, was for seven years chief chemist and assistant superintendent at A.P.W. Products Co., and was later affiliated with Orr Felt & Blanket Co.

Ken Hay, Mr. Miscall's predecessor in the territory, is now headquartered at Appleton, Wis.; he services the Illinois, Indinana, Michigan, Minnesota and Wisconsin territory formerly covered by L. F. Knickerbocker.

Executive Elections and Promotions at Gardner Board and Carton

The election of two new vice presidents and a series of appointments advancing seven other officials to more responsible positions was announced recently by The Gardner Board and Carton Co., Middletown, Ohio.

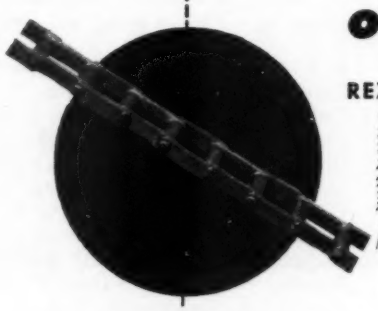
E. T. (Ted) Gardner, Jr., formerly treasurer of the firm, was elected vice president in charge of finance. Mr. Gardner has been associated with the company since his graduation from the Sheffield Scientific School of Yale University in 1935, and has held increasingly important positions since that time.

New vice president in charge of operations, Colin Gardner III, has been with the company since 1934 when he began work in the Lockland board mill as a clerk. Mr. Gardner, who has served the company as foreman of the manufacturing department, assistant to the operations manager and production manager, was made secretary of the firm in 1946 and operations manager in 1948. He holds a degree from Yale University, and has done post graduate work at the Institute of Paper Chemistry.

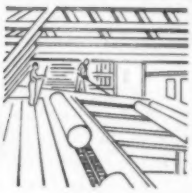
Three other vice presidents, Colin Gardner, Walter E. Sooy and Robert B. Gardner, were assigned increased responsibilities and elected to newly-created offices. Colin Gardner, who has

Chain Facts

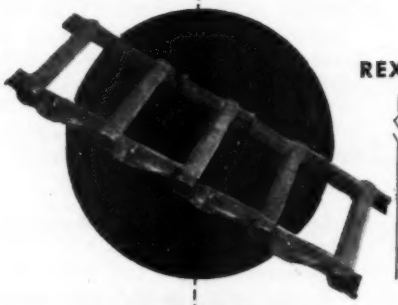
on REX pulp mill chains



REX COMBINATION AND DUROBAR CHAINS

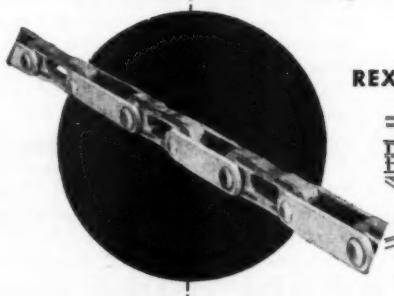


are husky chains with inside block links of malleable iron or Rex Z-Metal and side bars blanked from high carbon steel. Side bar pin holes are accurately punched for correct pitch and good drive fits. Milled flats on the ends of the pins prevent turning in the side bars and prolong chain life. Durobar Chains have reinforced outer barrel faces which eliminate rolling, grinding contact with sprocket teeth and thus reduce chain wear.

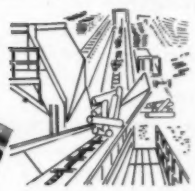


REX H-TYPE CONVEYOR CHAINS

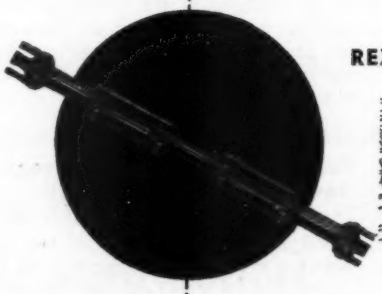
offer an efficient, economical means for conveying slabs, sawdust and other mill refuse. Operating in shallow troughs, these chains, because of their great width, offer the advantage of large capacity at low speeds. Chain links are one-piece castings. Inner barrel faces are designed for smooth operation over sprockets. Outer barrel faces are designed to act as scrapers. Wide wearing shoes, cast on the side bars, take the sliding wear, and vertical lugs reinforce and protect rivet ends.



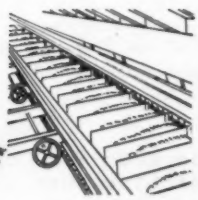
REX MILL REFUSE AND LOG CONVEYOR CHAINS



are stronger, tougher chains designed specifically for longer life under the pounding of logs and slabs. Alternating wide cast block links and steel side bar links combine rugged strength and a large sliding surface as well as maximum bearing area on the rivets. Cast block links are of heavy design, reinforced with two struts that provide a sturdy anchorage for scraper or chair attachments.



REX DROP FORGED CHAINS



are preferred for log haul and refuse conveyor service where high strength and relatively low cost are desired. Drop Forged Chains are flexible in two directions, and assembly and disassembly can be made without the use of tools. Chain parts are forged from high carbon steel and are carefully designed for large bearing areas and wearing surfaces. Links can be turned over to provide a new sliding surface after long service.

For the complete story on the complete Rex line of pulp mill chains, call your Rex District Office or write direct for Catalog 48-27. Chain Belt Company, 1714 W. Bruce St., Milwaukee 4, Wis.

CHAIN BELT COMPANY REX

DRIVE AND CONVEYOR CHAINS

FIRST FOR LASTING SERVICE

now available from stock

J. S. Scheuermann, vice-president of Bagley & Sewall Company, at the company's new offices at 500 Fifth Avenue, New York City.

a message to old friends about a new service . . . . .

● **The opening of New York offices for the Bagley & Sewall Company also marked the establishment of a new division of the company devoted to all types of slitting, rewinding, and laminating equipment.**

● **In charge of this office and the new converting division is J. S. (Joe) Scheuermann, widely known throughout the pulp and paper industry of North America for the past 26 years as a topmost sales engineer in this field. In his new capacity he has been made a vice-president of Bagley and Sewall.**

● **The New York office is set up to serve more quickly the mills and converting plants in all regions of the North American continent. Our new establishment, in direct touch with the engineering and manufacturing facilities at Watertown, is in the center of midtown Manhattan—capital of the world paper industry. Drop in any time to discuss any of the following in addition to converting equipment:**

Paper Machines
Laminating Equipment
Slitters and Winders

BAGLEY & SEWALL
500 5th Avenue, New York City

Foreign Office: Castle & Overton Co., New York City
Home Office: Watertown, New York

served as vice president in charge of sales since 1917, joined the company as a timekeeper in the board mill in 1919 following his graduation from Yale University. In his new work as executive vice president, Mr. Gardner will continue his direction of the sales department and management group.

The other newly-elected executive vice president, Walter E. Sooy, has been affiliated with Gardner since 1931. Elected vice president of operations in 1941, Mr. Sooy will continue in his new capacity to direct the general policies of the operations group, and will assume new responsibilities in management development.

Newly designated senior vice president, Robert B. Gardner, has for the past 40 years been active in the business founded by his father. He has headed the board sales department for more than 30 years, and was elected a vice president last May (P. I., June, 1950); in his new work he will continue active direction of that department while assisting in organizational development and planning.

In a realignment of the company's finance organization John J. Hain, former controller, was advanced to the post of treasurer; Floyd Lockard, former assistant controller, succeeds Mr. Hain. Calvin Lloyd, former cost accounting head, was named assistant treasurer and assistant secretary.

D. J. Richards Now Responsible for all Sales at Houghton

Filling the vacancy left with the recent passing of G. W. Pressell, vice president and director of sales of E. F. Houghton & Co., Philadelphia, (P. I., Aug., 1950); D. J. Richards, vice president—sales, has been placed in complete charge of all domestic and foreign sales activities of the company. Additionally, Mr. Richards will act as director of advertising, and will supervise the activities of the product development and sales development departments.

Concurrently, John F. Maisch has been appointed controller of the Houghton firm, under supervision of William F. MacDonald, president and treasurer.

Alma D. Fuller Leaves Jr. Red Cross to Direct AFPI Education

The former national publicity representative of the American Junior Red Cross, Alma Deane Fuller, was recently named director of the American Forest Products Industries, Inc., education division. In her new post, Miss Fuller will work with educators, urban and rural youth groups, and all individuals and organizations interested in encouraging better woodland management and protection in the United States.

Miss Fuller, a graduate of Kansas State College, began her career as a teacher in the public schools of Kansas, later becoming assistant state extension service editor in charge of 4-H Club and home economics publicity. During her association with the American Junior Red Cross, Miss Fuller did special work with the State Department in planning and writing the Voice of America broadcast series.

Three Promoted by Virginia Cellulose Div. of Hercules

Several promotions were recently effected at Hercules Powder Co.'s Virginia Cellulose Department at Hopewell, Va. Elmer F. Hinner, who has been associated with the Cellulose Department for the greater part of his 23 years of Hercules service, succeeds Lloyd Kitchel, who passed away recently. (P. I., Aug., 1950)

Chosen as Mr. Hinner's assistant is Forest B. Evans, former plant manager of the Virginia Cellulose plant at Hopewell. Mr. Evans' former assistant, Orval J. Hand, has been promoted to plant manager of the Hopewell plant.

J. L. Van Camp now G.M. Canadian Forestry Ass'n

The appointment of J. L. Van Camp to the position of general manager of the Canadian Forestry Association was announced recently. Mr. Van Camp, who succeeds Norton J. Anderson in the position, took over his new duties at CFA head office in Montreal, Que., on July 3.

Mr. Van Camp has worked constantly in forestry since his 1922 graduation from the Faculty of Forestry of the University of Toronto, spending some 10 years in the Dominion Forest Service. After postgraduate work at the University of Toronto, Mr. Van Camp served as an instructor at the Michigan State College; for the past fourteen years he has been doing extension forestry work for the State of Indiana from Purdue University.

•

Dr. Seyb Appointed To Manage Research at Diamond Alkali

With the retirement of J. E. Underwood, manager of research of the Research Department of Diamond Alkali Co., Cleveland, Dr. L. P. Seyb has been appointed to the position. Mr. Underwood has relinquished the post, held for the past six years, to become a research consultant for the firm.

Dr. Seyb came to Diamond in 1942 as a research chemist and group leader; his work there has included product development projects involving fatty acids, wetting agents, textile bleaching and flame-proofing as well as several

LODDING HYDRAULIC OSCILLATING SYSTEM—

universally applicable—oscillates any doctor on any roll. Space consideration no problem since oscillator occupies no more space than the doctor journal itself. One hydraulic line from each doctor to a master unit which can be located anywhere. One master unit can be used to oscillate as many as eight doctors.

Actuating cylinder journal of doctor. Note small space requirement.

The Lodding system offers low initial cost, low installation cost, low maintenance cost. This, plus the fact that it will fit anywhere a doctor will fit, including a great many places where oscillation has long been thought impossible, makes the Lodding Hydraulic Oscillating System the complete answer to the doctor oscillating problem.

Master unit serving all doctors oscillated. No valves—no circulating system.

Lodding Engineering Corporation, Worcester, Mass.
Represented by W. E. Greene Corporation,
Woolworth Building, New York.

other similar interests. Previous to his association with Diamond, Dr. Seyb, who received his Ph.D. in organic chemistry from the University of Iowa in 1939, had been employed by a Western petroleum company.

Two Men Promoted in Sales Dept. of G-E's Small Apparatus Div.

Two promotions have been made in the sales department of the Small Apparatus Division of General Electric, Schenectady, N.Y. Edward A. Green, formerly manager of sales of the firm's Control Division has been named staff assistant to A. W. Bartling, general sales manager of the Small Apparatus Division.

Now in full charge of the sales for all products of the G-E Controls Division is L. Dean Fowler, chosen to replace Mr. Green as manager of the Division.

Dr. McCleary Is Now Sectional Research Director at Calco

The appointment of Dr. H. R. McCleary as sectional director of the Application Research Department of American Cyanamid Co., Calco Chemical Division, Bound Brook, N.J., has been effected.

Dr. McCleary joined the Calco Physical Chemical Research staff in 1941. For the past several years he has been identified with the study of physical chemical properties of dyes and dyeing and the application of physical chemical techniques to Calco research, development and manufacturing. In his new work, Dr. McCleary will assist on special assignments covering all activities of his section.

F. T. Harris, director of publicity, International Paper Co., New York City, retired on July 31. Mr. Harris is well known in the industry; he has handled publicity for I.P. Co. for a number of years. He and Mrs. Harris look forward to some extensive travels.

E. D. (Pat) Casseday has been appointed Houston, Texas, District sales manager by Bridgeport Brass Co., Bridgeport, Conn. Mr. Casseday, who succeeds George Chatneuff in the assignment, was formerly with the company's Los Angeles office.

Edwin W. Kaler, who joined United Board and Carton Corp., Syracuse, N.Y., recently in the capacity of general sales manager, has been named a vice president of the corporation by the board of directors. Mr. Kaler's broad background of marketing and distribution includes executive positions at Talon, Inc., Daystrom Corp., and DeLuxe Clock and Manufacturing Co. Mr. Kaler will make his headquarters in Syracuse.

Pell W. Foster, Jr.

Pell W. Foster, Jr., has been appointed vice president in charge of newly created Equipment Division of Foster Wheeler Corp., New York. Mr. Foster, a director and vice president in charge of production since 1946, will continue as active head of the Production and Procurement departments. The purpose of the new division is the co-ordination of the present departments with the manufacturing and sales groups.

Charles F. Woods has been named valve division sales manager of the Southwest region for Minneapolis-Honeywell Regulator Co., Minneapolis. Mr. Woods will make Dallas, Tex., his headquarters. Concurrently, *Edward J. Byrne,* formerly located at the firm's Houston, Tex., branch, was named to succeed Mr. Woods as industrial manager of the Dallas branch, and *Howard W. Griesbach* of the Chicago branch was named industrial manager of the Milwaukee branch.

James T. Potter has been appointed engineering and sales representative in North and South Carolina by Graver Water Conditioning Co., New York. Mr. Potter, associated with the water treatment field for over 20 years, is making his headquarters at 1521 Stanford Place, Charlotte, N.C.

H. Crabtree has been appointed mill manager of the specialty paper mills of E. B. Eddy Co., Ottawa, Ont. Concurrently, *D. G. Currie* was named manager of manufacturing, and *C. B. Davies,* mill manager of the pulp and newsprint mills.

Dr. C. E. Simpson has joined R. S. Aries & Associates, New York, as a senior associate. Dr. Simpson, who left Carrier Corp. to join the Aries organization, has wide experience in plant layout and mechanical design work in the textile and food industries; his exploratory work on heat recovery and waste utilization has been valuable to the paper industry.

A TRADITION of INTEGRITY

— stands back of EVERY PUMP "by Aurora"

We recommend Type OD for municipal, industrial, institutional, etc. water supply — for handling condenser circulating water, liquids, chemicals and oils in paper mills, distilleries and refineries, irrigation, etc.

Write for BULLETIN 105

PUMPS "by Aurora"
TYPE-OD Horizontally Split Case, Double Suction Single Stage Centrifugal Pump.
Write TODAY for CONDENSED CATALOG "M"

DISTRIBUTORS IN PRINCIPAL CITIES

AURORA Always PUMPS

AURORA PUMP COMPANY

110 LOUCKS STREET, AURORA, ILLINOIS

TENAX FELTS

give you efficiency and economy as they aid you in making the finest possible paper

SPINNING THE YARN FOR A TENAX FELT IS DONE WITH PRACTISED CARE AND SKILL

With the speed and efficiency of modern machinery, numerous intricate processes are applied at the Lockport Mill as carefully and meticulously as by the old-time guild workers. As a result you are rewarded with a more profitable operation with Tenax Felts.

The Lockport representative in your territory is fully qualified to advise on all technical questions relating to felts. He is at your service as is our plant and all its people. We invite your inquiries.

LOCKPORT FELT COMPANY—NEWFANE, NEW YORK

M. W. Heinritz, formerly vice president of Gould Storage Battery Corp., was elected vice president in charge of the newly-named Gould-National Batteries, Inc., at a company meeting held recently. (See Industry News)

Dr. Edwin F. Pike, chemical engineering consultant, has joined Wallace Clark & Co., Inc., New York, as a special consultant in the chemistry field. Dr. Pike's background includes work here and abroad in the research and development, engineering, manufacturing and technical aspects of food, fine chemicals and pharmaceutical fields.

William A. Gray, formerly on the staff of the General Mills Co., Minneapolis, has been added to the Chicago sales staff of A. E. Staley Manufacturing Co., Decatur, Ill. Concurrently, *George A. T. Moore* was appointed an industrial sales representative in the company's Northwest territory, with headquarters in Minneapolis.

F. B. Havens, formerly technical field service representative for the Pigment Department of American Cyanamid Co., Calco Chemical Division, Bound Brook, N.J., has been appointed Pacific Coast regional manager. Mr. Havens, who has been associated with American Cyanamid since 1945, will make his headquarters in San Francisco.

J. Peter Munton, formerly assistant chief engineer of Rice Barton Corp., Worcester, Mass., has been appointed chief engineer of the firm. Mr. Munton, a graduate of the University of New Hampshire, has been associated with Rice Barton since 1936. His appointment came with the election of the former chief engineer, Everett W. Clem, to vice president in charge of engineering.

Wilbur C. Cochrane has been elected vice president of Great Lakes Paper Co., Toronto, Ont., Canada.

Lawrence Labbe has been appointed sales representative for general industrial chemicals in Toronto and Southwestern Ontario by Dow Chemical Co. of Canada, Ltd., Toronto.

Matthew Boyd Shirlaw has been appointed superintendent of the Winslow, Me., paper mill of Hollingsworth & Whitney Co., Boston. Mr. Shirlaw, who was formerly superintendent of the E. B. Eddy Co., Hull, Quebec, mill, succeeds *John A. Nivison.* Mr. Nivison's retirement from the firm ends an association of 46 years.

John B. Powell, associated with General Electric, Schenectady, N.Y., for the past 25 years, has been named manager of the Engineering Division of the G-E New England District Apparatus Department. Succeeding *George H. Jump,* newly appointed engineering consultant for the district, Mr. Powell will make his headquarters in Boston.

The Paper Industry Necrology

Howard R. Miller

A long time paper salesman, Howard R. Miller, passed away July 13. Mr. Miller, sales manager of the Monadnock Paper Mills, Bennington, N.H., office at New York City, had been eastern sales manager of Howard Paper Mills of Ohio before joining Monadnock about a year ago.

Mr. Miller had been allied with the industry for more than 25 years. He was a member of the Salesmen's Association of the Paper and Pulp Industry, and was a charter member of the Paper Club of New York.

The widow and one daughter survive.

Mathias DeZurik, president of the DeZurik Shower Co., Sartell, Minn., passed away July 30th. Prior to his organization of the DeZurik company, Mr. DeZurik was associated with the Watab Paper Co. for some 25 years, many of which were spent on the development of new processes and equipment now used in the paper industry. The widow and four children survive.

James R. Cartwell, owner of the Green Mountain Pulp Co., passed away August 12 at the age of 81. Survivors include the widow, four daughters, and a son.

N. A. Lewthwaite

The assistant to the resident manager of the Port Townsend, Wash., division of Crown Zellerbach Corp., Norman A. Lewthwaite, passed away August 2. Mr. Lewthwaite, who was 52 years of age, had been associated with C-Z since 1916 and had been at the Port Townsend division almost continuously since going to it as pulp mill superintendent in 1928. He had served in the newly-created position of assistant to the resident manager since 1947. Outstanding in Mr. Lewthwaite's long service to C-Z was the work done in 1934-44, when he headed a charcoal plant operated in Seattle for the Army's chemical warfare service.

Mr. Lewthwaite, a member of an old paper manufacturing family, is survived by his widow, two children, and two grandchildren.

Thomas M. Gillespie, well-known representative of the Lockport Felt Co., Cheney Bigelow Wire Works, and Wyandotte Chemicals Corp., passed away in Lake Villa, Ill., recently. He was 50 years of age. "Tommy" was considered a specialist on paper mill supplies and equipment. He is survived by his widow.

Dr. Samuel G. Trepp

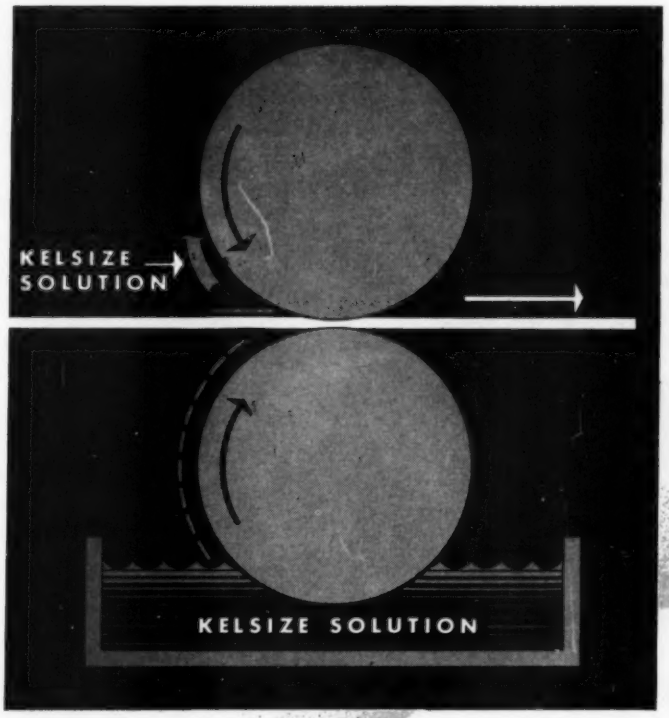
The chief chemist of the Research Division of Bird & Son, Inc., East Walpole, Mass., Dr. Samuel G. Trepp, passed away June 23. Dr. Trepp had been with Bird & Son since 1944, when he joined the firm to organize a new Research Laboratory.

Dr. Trepp, a graduate of the University of Michigan, also held M.S. and Ph.D. degrees from the same school. Before going to Bird Dr. Trepp worked for National Aniline at Buffalo, N. Y., on detergents and gum inhibitors; in 1937 he became associated with the United Gas Improvement Co. of Philadelphia, where resins were his subject of study.

The widow and four children survive.

Charles A. Bonnalie, Sr., superintendent of Crocker Burbank and Co., Fitchburg, Mass., passed away August 3 at the age of 55. Mr. Bonnalie became associated with the Crocker Burbank firm when he was 15 years of age; he had been with the mill continuously for the past 40 years with the exception of several years spent in the Navy in World War I. The widow and seven children survive.

James C. Lowe, for the past five years a sales engineer with Oliver United Filters Inc., New York, passed away July 9. Mr. Lowe, whose specialty was the engineering and sale of filters to the pulp and paper industry, had worked from the Chicago office.



KELSIZE

in your sizing solution use...

The Modern Surface Control Agent

FOR BETTER RESULTS ON

Finish • Surface Density • Wax Resistance

FOR

GLOSS INK PAPERBOARD
BUTTER CARTON STOCK
MILK BOTTLE STOCK
CARBONIZING PAPER

KELCO
REFINED ALGIN PRODUCTS

KELSIZE *a product of* **KELCO COMPANY**

20 N. Wacker Drive
Chicago 6

31 Nassau St.
New York 5

530 W. Sixth St.
Los Angeles 14

Cable Address: KELCOALGIN—New York

THE SOUTH — another in a series of scenes . . . areas where Appleton Wires serve the paper industry.

THE SOUTH—behind its carefully preserved tapestry of "old South" tradition, picturesque local color and romantic charm — is justifiably proud of thriving new industry, new commerce, new investments.

Here, too, pacing this energetic, creative, expanding activity, you'll find the paper industry. And, practically all of these mills already know that *Appleton Wires are Good Wires!*

APPLETON WIRE WORKS, INC., APPLETON, WISCONSIN

© 1950, Appleton Wire Works, Inc.

The Paper Industry International Review

Newsprint Needed In Australia

Unless additional newsprint is secured from Canada or elsewhere, Australia will be short this year of 30,000 tons of newsprint. Prospects of obtaining additional dollars for imports from Canada are not bright and Australian publishers who had hoped to get French supplies were disappointed when, after having made arrangements for the import of 10,000 tons, the French government introduced a system of export licenses with the result that Australia will only get 3,000 tons from that source this year.

Finland was expected to send 8000 tons and Czechoslovakia 14,000, but these, too, will not come as export licenses in the two countries could not be obtained.

There is a shipping scarcity between Tasmania and the rest of Australia and this has effected supplies even from Australia's own mills. And so prospective supplies for 1951 are reported to be shorter still. The government has not been responsive to continued requests for the provision of dollars to enable the importation of 23,500 tons of Canadian print or amended requests for 10,000 tons.

The Minister for Trade and Customs declared in the Senate, shortly before the Parliament went into recess, that any decision on imports of Canadian newsprint would be made "on the basis of rigid essentiality."

However, with the deterioration of the French newsprint position publishers will make one more attempt to get dollars from the government. High priced Italian and Austrian newsprint has been on offer tentatively but it is not believed that offers are necessarily firm or that any orders have resulted.

Company Notes

New Zealand Paper Mills Ltd. showed a profit for the year ended March of £16,276, a decrease of only £274 from the previous year. The dividend remained unchanged at 7 per cent, absorbing £14,000.

Tasmanian Board Mills Ltd. has announced a half-yearly dividend of 2½ per cent on the 5 per cent preference shares, payable on August 1.

New Zealand Forest Products Ltd. announced that it is expected that all plant and equipment for the new paper mill in New Zealand, estimated to cost £450,000, will be made in Britain. David Henry, managing director of the company, has just returned from Britain, Scandinavia and the United States. He said that a contract for most of the papermaking equipment for the pulp mill at Kinleith was awarded to Walmsley Ltd., Bury, Lancashire.

Ballarat Paper Mills Pty., Ltd., Melbourne, has announced that production of art and other coated papers is expected to begin soon at the firm's new mill at Ballarat in Victoria. It is anticipated that when full production is reached at the Victoria mill the company, together with its associate, the Papyrus Pty. Ltd., Sydney, will be able to fill Australia's full requirements for art and other coated papers. Distribution of products will be through the wholesale paper merchants.

New Paper Mill for Ireland

A new paper factory in Ireland—the Templemore Board and Paper Mills—is to be established at Templemore, County Tipperary. Construction work is to begin shortly and is expected to be completed in about 18 months. The plant will be situated on a 50 acre site at Aughall, half a mile from the town, on the Suir River.

The mill will specialize in the output of cardboard and plasterboard liners (a composition for surfacing the imported board) for the domestic market, which at present imports £800,000 worth (U.S. $2,240,000) of these products annually. It is the only board factory in Ireland, and it is expected eventually to supply domestic requirements and engage in export trade.

The principal raw materials will be waste paper and straw.

About 400 workers will be employed when the plant opens; the number is expected to be increased as production steps up. (From *Foreign Commerce Weekly*)

Another new mill, which is expected to give employment to about 500 workers, is to be built on a site along the River Suir, in *Waterford, Ireland*, and will produce mainly cardboard products. It will take about two years to construct.

The proprietors of this mill are the National Board and Paper Mills, Ltd., which firm has a nominal capital of £800,000 divided into 20,000 shares of £1 each and 2,400,000 shares of 5s. each.

THE CEYLONESE GOVERNMENT, which established a small paper mill in 1935, found that its success warranted expansion. Plans have been made for a larger mill on the East coast in Valaichcheni, which will use as raw materials illuk grass and rice straw. The recommended capacity at first is 3000-4000 tons per annum with the hope of increase to 7500 tons. Production is expected to start in 1951-1952. (From *Indian Pulp and Paper.*)

A MANUFACTURER OF PAPER in Bordeaux, France, has reported that France is oversupplied with domestically manufactured cigarette paper and onion-skin paper. This producer, a substantial prewar exporter of cigarette paper to the United States, stated that since 1939 he has not been able to export cigarette paper to this country because of competition from United States manufacturers. (From *Foreign Commerce Weekly*)

Foreign Abstracts . . . . . .

Groundwood Bleaching with Peroxide Compared with Usual Procedures

A brief historical review of sodium peroxide (I) bleaching is given, together with schematic diagrams showing continuous and discontinuous bleaching operations; sodium bisulphite (II) and sodium dithionate ($Na_2S_2O_4$) (III) bleaching techniques are also described and discussed. Spruce groundwood (IV) was bleached with a solution containing 20 grams I, 50 grams sodium silicate and 17 grams sulphuric acid per liter, followed by treatment with 1% II (based on dry IV). Bleaching at 15% stock consistency with 2% I at varying temperatures showed that optimum brightness was obtained at 40 C., thus involving no external application of heat. The optimum stock density (at 40°) with 2% I was about 8%. Brightness was influenced markedly by bleaching time and percent I based on dry IV.

The optimum increase in brightness (from an initial 55.8% up to 71.3%) was attained in 5 hours with 5% I; longer bleaching periods acted adversely. Whereas with 2% I, bleach consumption was at least 95% complete within 2.5 hours, this percentage consumption in the case of 5% I was reached only after about 23 hours.

Yellowing of the pulp was caused by irradiating with a quartz lamp (provided with a filter, yielding light of 366 millimicrons at 13.5 C. and 67% relative humidity. IV bleached with 0.5%, 2% and 5% I, dropped to the original brightness within 2, 6 and 8 hours respectively. Unbleached IV (within 8 hours) dropped to 47.7% brightness. Actually the greatest percentage drop in bright-

ness after 8 hours was manifested by IV bleached with 5% I.

When heated in the dark, in air at 100 C., very little yellowing occurred. Loss on bleaching with I was only about 0.75%. The lignin content of bleached IV was 0.52% lower than that of unbleached IV. The physical composition of IV bleached with I was only slightly changed, the relative decrease in screenings being greatest (17%).

Other changes included a slight relative decrease in long fibers, a very slight increase in medium and short fibers and an almost negligible increase in finestuff. IV sheets formed after bleaching with I showed no appreciable changes in sheet density, thickness, breaking length, or bursting strength, over those of the unbleached IV, but suffered somewhat in folding endurance and endurance bending numbers.

In all of the tests outlined above, tapwater was used. However, distilled water was shown to give considerably better brightness values and the importance of the character of the process water is emphasized. Extensive bleaching experiments (under controlled conditions) with varying percentages of aqueous II at 20 deg., at 17% stock consistency show that in no case was the brightness of IV increased to 62% and that with 2% II, after 16 hours, (irrespective of temperature and stock density) this brightness never exceeded 59.2%. Irradiation caused a decrease in brightness to that of the original IV within 2 hours. Brightness achieved within 1 hour with 5% III at 20 deg. and at 5% consistency, was practically identical with that attained by II within 16 hours. With III, the loss in brightness on irradiation was marked. Comparative results with IV, bleached with I, II and III (before and after irradiation) are tabulated and fully discussed.

In all cases, bleached pulps when irradiated show a greater percentage of loss in brightness than does the unbleached IV. Relative cost data are given for the 3 bleaching agents of which II is the cheapest. Twenty graphs and about 60 references are included. Walter Brecht, Georg Jayme, and Günther Schuster. *Das Papier* 4, 174-189 (1950) (In German.)

High Polymeric Additive Agents Related to Pulp and Paper Physical Properties

The application of various water soluble and emulsified polymers to eucalypt kraft pulp stock or by impregnation is discussed. Emulsified agents proved unsatisfactory; they either failed to affect or actually lowered the strength of the pulps, unless over 10% of the emulsion was applied, in which case, tearing strength was increased. Their application, however, led to products which were not paper in the usual sense. On the other hand, aqueous solutions of polyvinyl alcohol, carboxymethyl cellulose, guaran (guar mucilage), starch, gelatin, urea-formaldehyde (I) and melamine-formaldehyde (II) gave positive results. II showed the best, and I only slightly inferior effects.

These agents form strong bonds with the cellulose, and were shown to raise tensile, bursting strength and folding endurance. The effects on tearing strength (which are more complex, and which are dependent on the type and condition of the pulp) are fully discussed. When pulps of higher maximum strengths are required, however, the solution of the problem will not lie in the additives, but in the selection of fibrous raw materials and optimum cooking conditions. A. D. Brown, *Proc. Australian Pulp Paper Industry Tech. Assoc.* 3, 121-140 (1949). (In English.) With discussion of the paper on pp. 140-43.

Building Boards in India

This is another study analogous to that reported in THE PAPER INDUSTRY 32, No. 2, 314 (1950). Boards were prepared from wood shavings and sawdust by admixture with suitable binders. The following types were prepared—wood wool-cement (and wood wool-protein) boards; hard boards containing sawdust, coir, etc. treated with protein binders; and boards fabricated from sawdust and various types of formaldehyde resins. The properties of these products compare favorably with those of foreign boards, the best results being obtained with "ground-nut protein—formaldehyde" and phenol-formaldehyde resins. Extensive tabulated data are given. D. Narayanamurti, V. Ranganathan, and Bharat Singh Bist (Forest Research Inst., Dehra Dun, India). *Indian Forest Leaflets,* No. 110, 7 pp. (1948). (In English)

Cross Sectioning Paper and Films

The Hardy hand microtome serves to cut satisfactorily in cross section, paper and film. Strips of paper 4.5 mm. wide are placed in the slot of the instrument and unoccupied space is filled with fibrous material like coarse wool, mercerized cotton or artificial silk. This packing holds the specimen firmly in place. Surplus material and paper are cut off, and the surface is coated with a nitrocellulose lacquer which is allowed to dry thoroughly for 20 minutes. The section is then cut cleanly with the blade and any "sawing" action is avoided. This section with its cut surface *upwards* is placed on a microscope slide and mounted with Canada balsam (or other suitable medium). The paper may be stained either before or after sectioning. (Films can be treated in the same manner.) With practice, paper can be sectioned and mounted within 10 minutes. Photomicrographs are included showing a casein-coated paper stained with Ponceau RR, a paper containing melamine resin in the body and on the surface of the sheet, and a viscose film coated with polyvinyl chloride viewed in polarized light. N. van Kuyeren. *Papierwereld* 3, No. 24, 501-3 (1949); *Tech. Bull. Brit. Paper Boardmakers Assoc.* 26, No. 7-9 (1949). (The original is in Dutch; abstract in English.)

Determination of "Chlorate" Chlorine in Bleach Liquors

Bleach liquors containing appreciable amounts of organic matter and other oxidizable impurities were pretreated as follows: the sample, containing not more than 20 milligrams chlorate-chlorine per 250 cc., was oxidized with sufficient (equivalent) amounts of *N* potassium permanganate and *N* sulphuric acid at *room temperature* to insure an excess of the reagents after standing 24 hours. The decolorization should be complete within 2 days (but if it persists, the excess permanganate must be very cautiously destroyed with very dilute hydrogen peroxide).

The residual *active chlorine* in the alkalinized pre-oxidized solution was then determined by the use of 0.1 *N* arsenious acid (or sodium bisulphite) by Pénot's method. The solution is then transferred to a round bottom flask and refluxed 10 minutes with 25 cc. of a stock solution (made up of 56 grams crystalline ferrous sulphate, and 200 cc. sulphuric acid per liter). Subsequently the top of the condenser was stoppered tightly and the mixture cooled slowly (thus insuring a vacuum in the flask). To the cold mixture was added 60 cc. of a solution (containing 67 grams manganous sulphate, 33 cc. phosphoric acid and 133 cc. concentrated sulphuric acid per liter), and then titrated with 0.1 *N* permanganate (using Ferroin to accentuate the end point).

The amount of 0.1 *N* ferrous sulphate consumed times the factor 3.55 is termed "the chlorine loss (in milligrams) due to sodium chlorate formation" (because *6 atoms* of chlorine are used up in forming *1 molecule* of sodium chlorate). This method was shown to be both accurate and precise, and was a marked improvement over previous techniques. Although Rys's method in a number of instances gave results comparable with those obtained by the newer procedure, it is not suited for the determination of chlorate-chlorine in the presence of excessive organic matter. Theodor Höpner. *Das Papier* 4, 249-54 (1950). (In German.)

Steamed Mechnical Pulp

Blocks of spruce (I) and pine (II) (8 x 10 x 11 cm.) after treatment with saturated steam (4.7 atmospheres and 158 C.) for 1.5, 3, 5, 8.5 and 14 hours were stored 1-1.5 days and ground with a Pirna "AO" pulpstone under a grinding pressure of 1.53 kg/cm^2, a stone speed of 16.8 m./sec. at 48-49 deg. and a stock density of 2.4% (in the pit). Steaming caused sharp loss in brightness (which dropped from an initial brightness of 52% to 7% after 12 hours). Initial swelling in I rose sharply during the first 1.75 hours of steaming then dropped and rising again after 3 hours remained relatively constant. Qualitatively the same effects occurred (although less markedly) with II. Both I and II showed a steady rise in the percentage water retention with time of steaming. Loss in weight of I and II with time is a nearly linear function. After steaming 12 hours the loss in weight of I was 17%, that of II was 21%.

With increased steaming time, the efficiency of the grinder increased, and power requirements decreased. Steaming caused a decrease in slowness (less marked in II than in I). In contrast to unsteamed groundwood a mechanical fractionation of steamed groundwood showed a higher proportion of the longer fibers. With I, the length of steaming was correlated in the first 2 hours with a sharp increase in tensile strength, burst, tear-through and density of the test sheets, with slight increases thereafter (up to 6-8 hours steaming) followed by decreases in strength after steaming 8-10 hours.

So Soft...So Clean...So White

with a Big assist from Titanox

• Facial tissues—modern cellulose counterpart of the old-fashioned handkerchief—supply an ever-growing answer to hundreds of intimate tasks.

Contributing much to the rapid public acceptance of tissues has been the ability of TITANOX pigments to impart sales-impelling appearance to these products. For example, just a little TITANOX-A-WD added to the beater significantly boosts the whiteness and opacity of facial tissues, without adversely affecting the softness of the cellulose fibers.

Our Technical Service Department is ready at all times to help you with your problems in pigmenting all types of paper. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; 104 South Michigan Avenue, Chicago 3, Ill.; 2600 South Eastern Avenue, Los Angeles 22, Calif. Branches in all other principal cities.

8315

® TITANOX

the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

Concomitantly there was a very sharp initial drop in air permeability during the first 2 hours followed by a gradual rise. Brightness of the groundwood decreased markedly with steaming, but pulp sheets invariably showed a higher brightness than did the sections of steamed wood. Further losses in weight were noticed after grinding steamed wood. Thus the total loss was 32% for I and 25% for II. In general the over-all groundwood pulp quality of I was better over a constant 4 hour period than that of II (although the brightness was not noticeably different).

Extensive studies were also made on the influence on groundwood of steam temperature (and pressure). With rising temperature the water content in I increased gradually whereas that of II rose sharply (to a maximum) at 130 C. Swelling was far more marked in I than in II, reaching a maximum at about 140 C. Losses in weight were slight at 130 C. but rose sharply at higher temperatures (especially in the case of II).

Rises in steam temperatures caused: increased darkening (resulting finally in a brownish-black pulp), a regular decrease in output up to steam temperatures of 148-50 C., followed thereafter by a steady rise; a sharp rise in slowness to a maximum at 150 C., followed by a sharp decrease at higher steam temperatures, a steady increase in medium fiber lengths (up to 160 deg.) followed by a decrease at higher temperatures, rise to maximum breaking length at 150 C., a steady, sharp rise in sheet density. The weight per unit volume was somewhat greater with brown groundwood than with unsteamed groundwood. Thirteen graphs are given, and a table shows the difference between groundwood at 158 deg. (using varying time periods) with that formed within 4 hours (at different steam pressures). Walter Brecht and Wilhelm Kilpper. *Das Papier* 4, 240-249 (1950) (In German).

Influence of Electrolytes on Pulp and Paper Properties—Cation Effects

The washing of pulps, to remove salts, significantly affected properties of the paper made from unbeaten pulp, and also influenced the pulp's response to beating in a Lampén mill. The effect of washing with dilute acids was greater than that of water, but both acid and water-washed pulps were equally sensitive to cation effects. In most experiments a eucalypt kraft (I) was used. Physical properties of the paper are influenced by electrolytes in the process water. Within limits this effect increases with the cation concentration and (with some exceptions) varies with the valence of the cation. In general monovalent cations cause an increase in strength properties; most divalent cations have relatively little effect, whereas tri- and tetravalent ions cause a reduction in pulp strength. Freeness and air resistance are most affected (by all cations), the former increasing, the latter decreasing with increased cation concentration.

To most cations, bursting (II) and tensile strength (III) are also sensitive (although with certain cations like calcium and magnesium, the results are somewhat irregular). With increasing concentrations of ferrous, zinc, and trivalent cerium and tetravalent thorium ions, II and III drop, reaching in some instances, a constant value. The least sensitive properties were bulk and internal-tear resistance, and were affected only when the process water contained hydrogen or polyvalent cations. Bulk increased and the tear factor decreased. Drainage time is also sensitive. The time of drainage decreases with increasing concentration and is most markedly affected by polyvalent cations. The effects were not restricted to I, but also were shown by spruce sulphite and pine and hemlock kraft pulps. With the cations leading to *decreased* strength properties, the greatest effect was due to retardation of beating. With those which led to *increased* strength properties, beating was accelerated.

The similarities between the effects produced on the zeta-potential of cellulose by dilute solutions of electrolytes and those reported here, suggest that the latter may be related to the electrokinetic properties of the pulp. Differences in the mineral content of the water supplies at different laboratories may lead to different results in matched pulp samples. These differences can be avoided by using electrolyte-free water in pulp evaluations. 16 references. W. E. Cohen, G. Farrant, and A. J. Watson, *Proc. Australian Pulp Paper Ind. Tech. Assoc.* 3, 72-101 with discussion pp. 102-4 (1949).

Reburning Lime Sludge

At Karlsborgsverken, a plant reburns lime sludge in a rotary kiln heated by producer gas from wood waste (which is itself dried to 8-10% moisture in a rotary drier heated by waste gases from the kiln). When the sludge is first filtered it contains about 45% moisture. The furnace temperature ranges from 1100-1200 C., that of the waste gases amounts to 250-300 deg. The reburnt lime contains 78-80% calcium oxide and 6-8% calcium carbonate. The kiln delivers 30 metric tons *per diem*.

A heat balance shows that 31% is used in drying the sludge, 22% for burning, 8% is lost with the lime, 15% is lost by radiation, 10% is used in drying the wood (fuel) and 14% is lost in the gas from the drier. Heat losses constitute the present weakness in the system. However, by comparison, the reburning is relatively cheap. Lime can be produced from sludge at 41 Swedish crowns/ton of lime, whereas lime from limestone costs 78 Swedish crowns. Three tables and 2 diagrams are given. R. Martin-Löf. *Svensk-Papperstidn.* 53, No. 5 121-6 (1950) (In Swedish, with an English summary).

Sticking at the Press; Its Nature and Remedy

In practice, in order to avoid adhesion at the press (in the Maryvale Mill in Victoria) it was necessary to overcook eucalypt wood, thus involving a costly operation. Sticking was alleviated by addition of a solution of sodium carbonate to the pond before the doctor, but this procedure had many disadvantages.

Experiments indicate that all substances which form sparingly dissociated compounds with iron and aluminum prevent sticking, when applied in dilute solutions to the press roll. Thus "Calgon" (I) (sodium hexametaphosphate) was found far more effective as a preventative agent than was sodium carbonate. Other substances which prevented sticking were caustic soda, phosphoric acid, sodium phosphate, sodium fluoride, sodium silicate, etc.

The following cause the sheet to stick: bakelite, steel or bronze scrapers held on the roll, paper makers alum, aluminum chloride, ferric chloride, glue, starch and sodium sulphide. Many other substances (e.g. rosin, size, hydrogen sulphide, and acetic acid) had no effect either way. The author submits a hypothesis to explain "sticking", and its prevention. The continuous addition of two pounds I *per diem* to the press roll pond prevents sticking completely and permits the use of hard pulps which otherwise could not be handled on the paper machines. C. T. Farmer. *Proc. Australian Pulp Paper Ind. Assoc.* 3, 105-114; Discussion 114-20 (1949).

The Wet Strength Determination

The usual method in which the sample paper strip is submerged for a specified time period and then treated under a definite pressure between *filter papers* may lead to high results in the determination of wet strength (I). The most satisfactory method for determining I, however, consists in keeping the sample strip actually submerged while the breaking length is determined. The equipment used is a simple modification of the Schopper tensile strength apparatus, and the additional equipment and its operation are fully described.

The older method for determining I could be successfully modified by using *sized* paper (II) in place of the filter papers originally specified. When the sample strip is pressed prior to the final test, or when the wet strip is tested directly without pressing the results check closely with those obtained by the new method (i.e. with the modified Schopper). The method using II was found quite satisfactory for routine testing. J. G. Reith. *Das Papier* 4, 237-40 (1950) (In German).

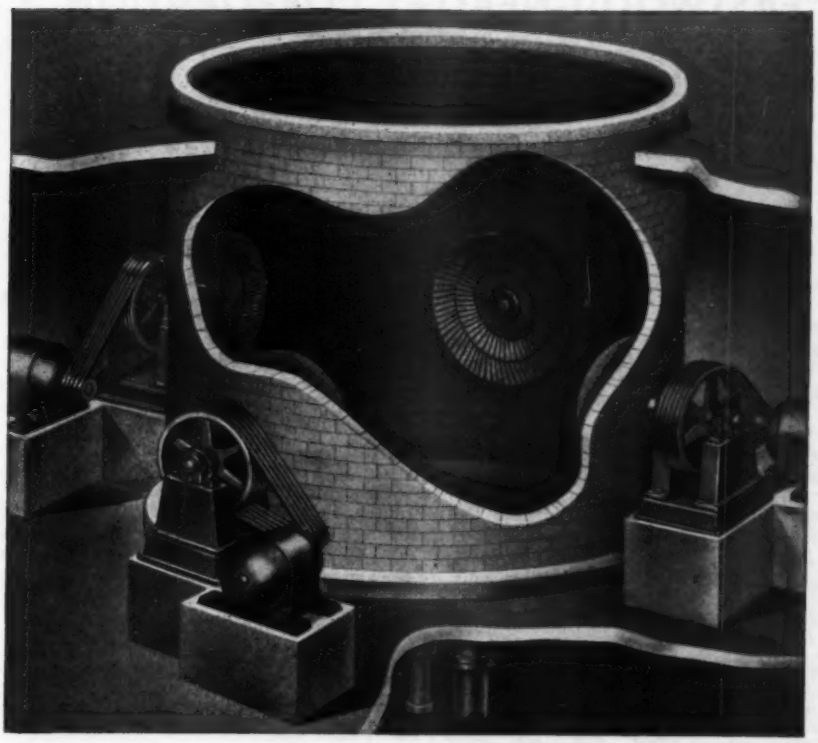
Pulp Viscosities

The importance of excluding air from cuprammonium hydroxide pulp solutions which are to be used in making viscosity determinations led to the present study. In a well-sealed powder flask, 100 cc. of the cuprammonium solution is shaken with the pulp and with 20 grams of carefully cleaned metallic copper wire (cut into 1.5 gram pieces). The copper serves a threefold purpose. It serves to fill the flask and to exclude most of the air, it removes oxygen from the residual air, and it also causes disintegration of the pulp on protracted shaking.

In this way the use of nitrogen is avoided and viscosities will remain unchanged even after the pulp solution has stood overnight. The technique is described in detail with appropriate sketches of the equipment, and it satisfactorily replaces the much more expensive cupri-ethylene diamine method devised by Straus and Levy (cf. *Paper Trade J.* 114, No. 3, 31-4 (1942).) Helmut Doering *Das Papier* 4, 197-9 (1950). (In German.)

The Rice Barton QuatroPulper

. . . a high production machine . . . ideal for disintegrating pulp, broke or waste paper



Other DynoMachines:

- The **QuatroPulper** is designed for processing stock in large capacities . . . either batch or continuous operation.
- The **DynoChest** is primarily for disintegrating stock in slush form . . . batch operation.
- The **DynoFiner** is for performing the same operation on a continuous basis.

THE stock is charged all at one time into the top of the vat. Four DynoPellers (described below) subject it to the vigorous dynomizing action that completely separates each fibre from its neighbor, maintaining its original length. The simple operating principle and design of the QuatroPulper eliminates the "wracking" and grief of other types of pulpers. Because there are few moving parts there is no loss of production time due to repair or adjustment. The QuatroPulper defibers the stock at low cost and produces a high quality slurry quickly and effectively.

Let us tell you how the QuatroPulper can save YOU *money in processing* YOUR *particular stock. Write today.*

RBR8

The DynoPeller ·····› is the heart of all DynoMachines. Its concave face is lined with rough, hard carbide particles. As the DynoPeller rotates it causes a suction at its center that pulls the stock towards it. Centrifugal force then causes the stock to flow rapidly over the rough carbide particles. This effective dynomizing action completely disintegrates the stock . . . separating each fibre from its neighbor while maintaining its original length.

RICE BARTON Research Corporation

WORCESTER 1, MASS.

One of the Women Behind Eastwood Wires

Josephine Van Dyke

Tests the "Mettle" of our Wires

Every spool of wire that we draw must pass three physical tests:

1. SIZE—diameters are checked on a special micrometer that makes it possible for us to measure our wires to one ten-thousandth of an inch.

2. TENSILE—the breaking point of each spool of wire drawn is measured under a pulling load to assure uniform strength of wire.

3. ELONGATION—this test determines whether the correct amount of "stretch" is in the wire—a vital factor in the life of the wire.

Through these tests we assure ourselves of a supply of strand wire of uniformity necessary to produce high quality fourdrinier wire cloth.

EASTWOOD-NEALLEY CORPORATION • Belleville, N. J.

Manufacture of cellulose pulps from straw

S. I. ARONOVSKY

(Continued from page 628)

wood or wood pulp at relatively high cost, produce and use straw pulps as major ingredients of practically all of their papers and paper products.

The rapid expansion of wood pulp production since the early part of the present century, together with the tremendous expenditure of lumber and pulpwoods in the two world wars during this period have focused world attention sharply upon the relatively low reserves of coniferous pulpwoods, the major raw material for the paper and board industries. Many wood pulp mills in North America are finding that transportation represents an ever increasing portion of manufacturing costs, as the coniferous pulpwood supplies recede farther and farther from the mill sites. This fact together with the increased cost of woods labor has caused the paper industry to use the faster growing hardwoods and to consider seriously the stems of annual crops as supplementary raw materials.

Contrary to the situation with pulpwood, straw and other fibrous agricultural residues are renewed annually wherever grain and other food and feed crops are grown. Cereal grain straws are preferred to the other crop residues for pulp and paper because of their relatively low content of pith and other structural parts generally found unsuitable for papermaking. It must be emphasized that only that portion of cereal grain straws or other agricultural residues *surplus* to farm needs can be considered for industrial utilization. Where good agricultural practice requires these materials for litter and bedding or for the soil, these uses should be considered foremost.

Availability of straw

Cereal grains constitute a major staple of human nutrition. Straw, a co-product of grain production, is available wherever grain is grown. The estimated amounts of small grain straw produced in 1947 on the various continents are given in Table 1. Somewhat larger amounts were produced in 1948 and 1949.

The enormous annual world production of nearly a billion tons of small grain straw staggers the imagination. It is estimated that only about 49 per cent of the straw grown is generally recoverable for farm and non-farm use. This percentage varies with requirements and cultural practices of the

Table I.—Estimated world production and industrial availability of small grain straw in 1947

Continent	Straw Production and Availability in 1000 Tons						
	Wheat[2]	Rye[3]	Oats[4]	Barley[5]	Rice[6]	Flax[7]	Total
North America							
Production	120,540	3,429	38,896	15,045	3,436	4,452	185,798
Available[1]	59,065	1,680	19,059	7,372	1,684	2,181	91,041
Europe							
Production	71,050	43,313	31,876	19,824	1,844	412	168,319
Available[1]	34,815	21,223	15,619	9,714	904	202	82,477
Asia							
Production	105,700	1,374	2,314	24,249	224,476	1,285	359,398
Available[1]	51,793	673	1,134	11,882	109,993	630	176,105
U.S.S.R. (Europe and Asia)							
Production	61,250	80,500	21,320	10,974	--	1,279	175,323
Available[1]	30,013	39,445	10,447	5,377	--	627	85,909
South America							
Production	21,350	1,225	1,274	1,876	5,235	3,108	34,068
Available[1]	10,462	600	624	919	2,565	1,523	16,693
Africa							
Production	9,100	150	572	3,717	5,655	50	19,244
Available[1]	4,459	74	280	1,821	2,771	25	9,430
Oceania							
Production	16,275	--	978	836	162	29	18,280
Available[1]	7,975	--	479	410	79	14	8,957
Total							
Production	405,265	129,991	97,230	76,521	240,808	10,615	960,430
Available[1]	198,582	63,695	47,642	37,495	117,996	5,202	470,612

Table II.—Dimensions of Fibers from Various Plants and Woods

Source of fiber	Average length μ	Average diameter μ	Ratio Av. length/ diameter
Wheat, barley, oats, rye straws	1,480	13.3	111:1
Rice straw	1,450	8.5	170:1
Esparto grass	1,100	9.2	120:1
Sugarcane bagasse	1,700	20.0	85:1
Red spruce wood	2,700	32	85:1
Red gum wood	1,600	32	50:1

Table III.—Proximate composition of some American straws

Straw	Wheat	Rye	Oats	Barley	Rice	Seed flax
Ash %	6-8	4-6	6-8	7	16-19	5
Solubility in alcohol-benzene %	2-5	3-5	2-4	5	4-5	4
Solubility in water %	10-18	10-14	9-14	16	13-15	14
Lignin %	17-19	18-19	18-20	15	12-14	23
Pentosans %	27-32	28-31	27-30	25	23-25	25
Cross & Bevan cellulose %	50-54	50-54	45-53	48	46-49	47
Alpha-cellulose %	33-38	33-38	31-39	34	28-36	34

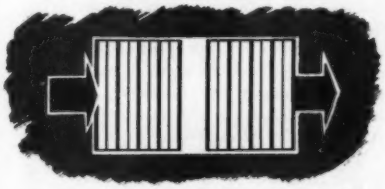
(1) Calculated as 49 per cent of the total straw produced. *(2)* Production calculated as 70 tons straw per thousand bushels of wheat. *(3)* Production calculated as 87.5 tons straw per thousand bushels of rye. *(4)* Production calculated as 26 tons straw per thousand bushels of oats. *(5)* Production calculated as 35.4 tons of straw per thousand bushels of barley. *(6)* Production calculated as 33.8 tons straw per thousand bushels of rice. *(7)* Production calculated as 84 tons straw per thousand bushels of flax.

These 10 BIG Features Make Western Precipitation COTTRELLS Outstanding in the Paper Industry

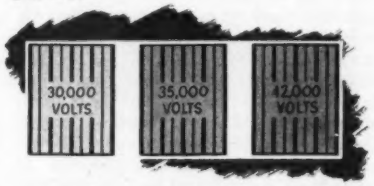
When considering COTTRELL Equipment for salt cake recovery, or any other application in the paper industry, remember this . . . *Western Precipitation Corporation not only pioneered the first commercial application of* COTTRELL *equipment made in any industry, but also pioneered the first application of* COTTRELL *equipment in the paper industry.*

Among the vitally important advantages found in Western Precipitation COTTRELLS, the following are particularly important in paper mill installations . . .

1 Sustained Year-After-Year Efficiency: The recovery efficiency of Western Precipitation COTTRELLS does not fall off in service. All parts are of ample design to maintain guaranteed over-all efficiency year-after-year —not for just a single acceptance run.



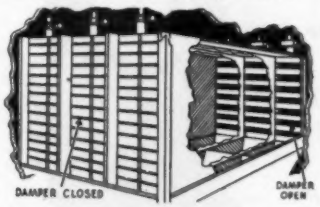
2 Higher Recovery: The horizontal flow design of Western Precipitation COTTRELLS eliminates collected material falling countercurrent to incoming gas stream. This assures higher recovery, minimum resuspension of recovered material in gas stream.



3 Maximum Performance: Horizontal flow of Western Precipitation COTTRELLS permits use of multiple electrical sections so that voltage in each section can be varied to dust loading for maximum recovery without arc-over or electrical breakdowns.

4 Lower Over-all Cost: When comparing COTTRELL costs, be sure to compare total *installed* cost, including duct work.

5 Simpler Maintenance: Because all interior parts and electrode systems are readily accessible, Western Precipitation COTTRELLS are far easier to maintain and service. Saves "down" time, saves repair costs.



6 Greater Adaptability: Horizontal flow design permits use of multi-vane dampers in multiple-unit installations. Thus, one unit can be shut off completely to permit maintenance operations without closing down entire Precipitator. Also, the dampers can be used in slightly-closed position to assure more uniform gas distribution.
On single-unit installations, chain curtains assure uniform distribution of gases. Curtains are easily kept clean by shaker mechanisms provided.

7 "V"-Shaped Hoppers: Horizontal design permits use of continuous "V"-shaped hoppers for collecting recovered material. Steeply-sloped walls in this type of hopper prevent build-up or bridging of recovered material.

8 Space-Saving Compactness: Not only do their horizontal design permit maximum compactness in Western Precipitation COTTRELLS, but various sections of a unit can be arranged for indoor installation in space above cascade evaporators, thus utilizing space otherwise wasted.

9 All-Weather Construction: Western Precipitation COTTRELLS are built for both indoor or outdoor installation, and this organization has had extensive experience with special construction to prevent excessive corrosion in rigorous northern climates.

10 More Extensive Experience: Since pioneering the commercial application of COTTRELL Precipitators over 42 years ago, Western Precipitation has consistently led in developing one unique advancement after another. Such features as 4-Point Electrode Suspension that eliminates misalignment of electrodes and reduction in recovery efficiencies . . . Unusually Rugged Rapper Design that assures proper cleaning of electrodes . . . Extensive Experience with all types of electrode designs . . . and many other advantages assure you the ultimate in COTTRELL design and efficiency when you bring your recovery problems to Western Precipitation engineers.

Without obligation our nearest representative will gladly make Western Precipitation COTTRELL *experience available to you for solving your particular recovery problem. Why not contact him today?*

IMPORTANT! In addition to COTTRELL *Electrical* Recovery equipment, Western Precipitation Corporation also designs and installs the well-known MULTICLONE *Mechanical* Collectors for hogged-fuel fired boilers. These units are unusually compact, highly efficient and can be readily fitted into existing plants at minimum installation costs. *Write for details!*

Send for Helpful Literature

WESTERN Precipitation CORPORATION

ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1037 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
CHRYSLER BLDG., NEW YORK 17 • 1 LaSALLE ST. BLDG., 1 N. La SALLE ST., CHICAGO 2 • HOBART BUILDING, SAN FRANCISCO 4, CALIFORNIA
PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

different lands. The remaining 51 per cent of the total straw produced, including stubble, short straw, and chaff, is left on the ground or plowed under to supply humus and plant food. In the more densely populated, intensively cultivated, arable areas of the world, particularly the Orient and some parts of Europe, a large proportion of the recoverable straw is used for fuel. A considerable amount of straw in these areas is also returned to the soil, mostly as manure. In North America, however, where practically all small cereal grains are combine harvested, it is estimated that almost half the recoverable straw, or about 40 million tons, is either burned or left to rot on top of the ground; neither practice yields much of value to the soil or the farmer. Similar situations probably exist in other lands with large farming areas not too densely populated.

Suitable types of straw

Commercial and laboratory experience in Europe and the Americas shows that wheat and rye straws are preferred over other straws and produce stiffer corrugating paper and stronger fine papers. The leafy character of oats, rice, and barley straws probably accounts for the relatively low yields and strength values of their pulps, but this feature makes them valuable as a supplementary feed for livestock, thus providing a good farm use and a competitive market.

PEDIGREED DOGS

THE SEALYHAM — Once a working terrier whose short legs enabled him to hunt underground, is now popular as a house dog.

The DRAPER Felt

The Felt with a Pedigree

DRAPER BROTHERS COMPANY

Woolen Manufacturers Since 1856

CANTON, MASSACHUSETTS

RALPH E. BRIGGS, *Sales Manager*

BRADFORD WEST, *Pittsfield, Mass.* WILLIAM N. CONNOR, *Jr., Canton, Mass.* L. H. BREYFOGLE, *Kalamazoo, Mich.*
WALTER A. SALMONSON, *2514 Northeast 59th Ave., Portland, Oregon* L. L. GRIFFITHS, *Jr., Kalamazoo, Mich.*
HAROLD H. FISH, *Syracuse, N. Y.*

Collection and transportation

Most cereal grains in North America are now harvested, from Texas in the South to Canada in the North, in a season that lasts about two months. The change in harvesting methods brought about a serious apparent straw shortage at the same time that larger amounts of straw were actually being produced. This was because of a lack of sufficient and suitable economical equipment for picking up the straw left scattered on the fields by the combine. In recent years, however, such apparent shortage has been largely overcome by availability of low-cost, one-man pick-up balers. The straw-consuming paper mills in the United States who had to go hundreds of miles from their plants to obtain sufficient straw, now obtain their supplies within 25 to 50 miles from the mill.

The shortened harvest season involves storage of a major portion of the baled straw and, consequently, the exposure of more straw to weather and microbial attack. This problem has been largely solved in the last few years, through co-operative work between the strawboard industry and the Northern Regional Research Laboratory. The tops of the piles or ricks of straw bales are now dusted with a relatively small amount of borax, which is an excellent, economical preventative of microbial degradation of straw exposed to rain or snow. Other methods of straw preservation being tried include sisal kraft paper, sheet metal, and loose straw as coverings.

Physical structure

Culms of small grain straw are erect, elastic, generally tubular structures, separated at intervals by nodes—vascular bundles crowded and interlaced to form a strong diaphragm between the internodes. Straws grow about 2 to 6 feet tall depending on variety and cultural conditions. They usually have six internodes which increase in length from base to apex of the straw. The wall thickness of the straw decreases with the distance from the ground.

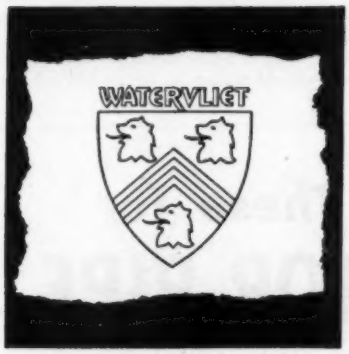
The bast cells or fibers from the internodes form the major part of straw pulp. They are comparatively short and slender with sharp pointed ends. Dimensions of these straw fibers vary somewhat with the kind of straw, but dimensional differences between straw fibers and the common wood fibers are generally greater than those among the various straw fibers themselves (Table 2). The straw fibers are somewhat longer than those from esparto, shorter than those from coniferous woods, and approximately as long as the fibers from deciduous woods. The excellent paper-formation characteristics of straw fibers are indicated by their relatively high ratio of average length to diameter.

Straw pulp also contains epidermal cells, platelets, serrated cells, and spirals, all being small and relatively nonfibrous. They come mainly from the vestige of pith on the inner part of the stem, from the nodes and rachises (heads), from the leaf blades and sheaths, and from the chaff (a small amount of which nearly always accompanies the straw).

Chemical composition of straws

Proximate chemical analyses of several American straws are shown in Table 3. The

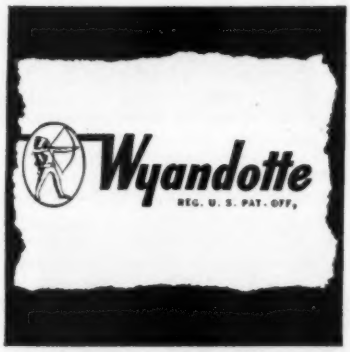
Famous trademarks in paper



This distinctive trademark of the Watervliet Paper Company identifies several well-known brands of uncoated and coated papers.

Thorough testing of the raw materials that go into Watervliet Papers, together with frequent quality tests at every stage of manufacture, assures finished paper products that meet the most exacting specifications.

...and paper making chemicals



Working in close co-operation with many leading paper manufacturers, Wyandotte Chemicals Corporation has developed such specialized products as Wyandotte Precipitated Calcium Carbonate *(Purecal-M*)*, a "tailor-made" paper-coating pigment with several unique advantages.

This truly fine chemical helps provide a superior coated sheet with respect to brightness, opacity, ink absorption, and printing qualities. And it has the characteristics desirable for "on-the-machine" or "off-the-machine" coating. It is uniform in quality and particle size . . . entirely free from grit and other abrasives.

Complete information and technical data on Wyandotte Purecal-M will be sent on request.

**Purecal-M is Wyandotte's new trade name for Precipitated Calcium Carbonate.*

Wyandotte Chemicals Corporation
Wyandotte, Michigan • *Offices in Principal Cities*

SODA ASH • CAUSTIC SODA
BICARBONATE OF SODA
CALCIUM CARBONATE • CALCIUM CHLORIDE
CHLORINE • HYDROGEN • DRY ICE
SYNTHETIC DETERGENTS • GLYCOLS
CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE
PROPYLENE DICHLORIDE
AROMATIC SULFONIC ACID DERIVATIVES
OTHER ORGANIC AND INORGANIC CHEMICALS

range in values of the individual straw constituents reflects the effect of both straw variety and of soil and cultural conditions of growth. This range in values is similar to that generally found for woods and other fibrous plant materials.

All the straws, excepting seed-flax straw, contain less lignin than is found in pulpwood. Straws also have lower cellulose and higher pentosan contents. The higher cellulose and pentosan contents of wheat and rye straws, compared to other straws, account for the preferred position of the wheat and rye straws for pulp and paper. Rice straw is easily characterized by its high ash content, mainly silica (SiO_2).

Technology of straw pulping

Modern technology of pulp and paper manufacture has been centered almost entirely on wood as the raw material. While a voluminous literature has accumulated on the production of pulp and paper from straw and other agricultural residues, a survey of the literature leads to the conclusion that the previous approach to this problem, namely, the production of cheap substitutes from farm residues, was unsound both technologically and economically. Most reported work deals with scattered experiments in educational institutions and mill laboratories, and with commercial trial runs wedged into production schedules. The laboratory work, with a few exceptions, was carried out without regard to the technology and economics of commercial operation. The exceptions refer to some excellent work reported about 20 years ago in the United States and to recent studies by Jayme in Germany and by Ritman and his co-workers in the Netherlands. In the large-scale mill trials the inconclusive results of one or several runs, made without suitable control because of production schedule requirements, were frequently used to determine the success or failure of the process or modification involved. Thus a new method of attack appeared necessary for successful solution of the problem of economic production of pulp from straw and other agricultural residues.

Straw pulping at Northern Laboratory

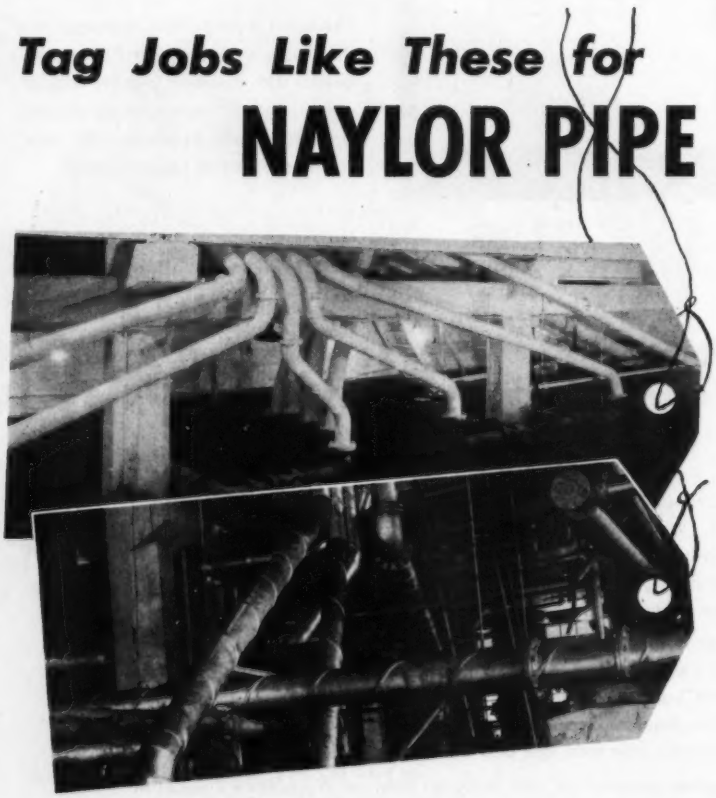
After considerable thought it was decided that the soundest approach would be to determine the properties and characteristics of the various agricultural residues and the fundamental differences among themselves and between them and other papermaking materials. Then, by capitalizing on the particular properties of the residues it should be possible to establish their rightful place in industry on a utilitarian and economic basis. Several examples of commercial enterprises in the pulp and paper field, wherein success resulted from recognition and utilization of the specific properties of the agricultural residue materials involved, are: excellent lightweight book and Bible paper from esparto, stiff corrugating paper from cereal straws, superior insulating board from sugarcane bagasse, and cigarette paper from seed flax tow. These examples indicate the soundness of the stated plan of attack, which was also approved by a large number of mill operators and technical men.

The first work in this program arose with the war emergency. It was found that the very thin barley and rice straw alpha-pulp fibers were suitable for replacing the fine asbestos fibers used with coniferous alpha-cellulose pulps to produce the filters for gas masks. The blend of fine straw fibers with the coarser wood fibers produced a filter with a high retention of smoke and fume particles without decreasing the permeability of the filter pad to air.

Coarse straw pulp

Attention was also turned to the problems of the strawboard industry in the United States, which consumes about 500,000 to 600,000 tons of straw annually. Many strawboard mills have excellent laboratories and equipment designed for testing the finished paper and for developing new conversion products. They had done relatively little work, however, to improve the pulping of straw. A survey was made of the pulping conditions used in the various mills and studies were begun at the Northern Laboratory aimed at improving the quality of strawboard pulp. Co-operative efforts by the strawboard mills and the Northern Laboratory have produced excellent results. It was found that caustic soda, sodium sulfite, or mixtures of these chemicals in small proportions produced pulps with considerably greater crush resistance than had been obtained heretofore by using lime either alone or as the major pulping chemical. The slightly lower yields of pulp resulting from the use of the soda alkalies are more than offset by the better strength and operating

Tag Jobs Like These for
NAYLOR PIPE



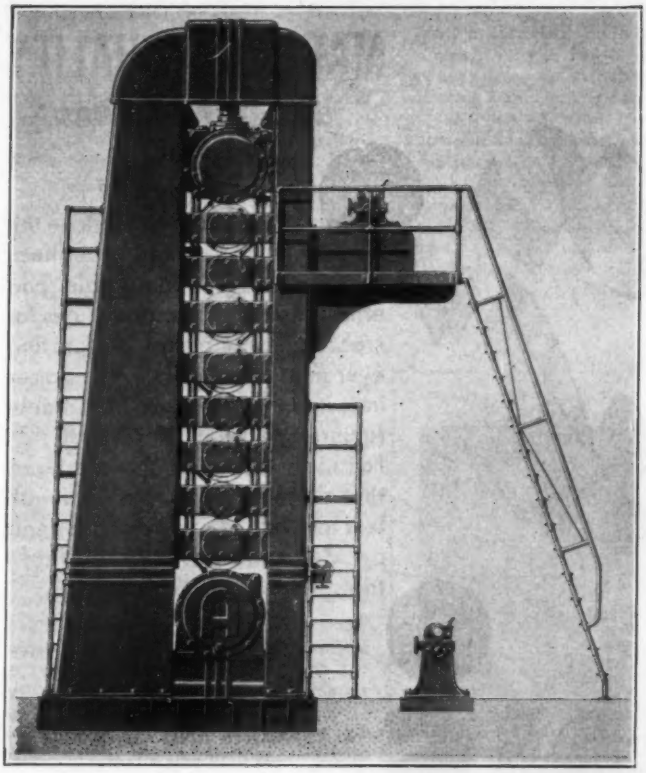
Once you use Naylor Pipe, you'll know why so many paper mills depend on it.

No other light-weight pipe can give you Naylor performance because no other pipe has the exclusive Naylor Lockseam Spiralweld structure. This difference adds up to pipe that is extra strong and safe . . . pipe that gives you *plus* value right down the line.

Whether it's pipe for stock and pulp lines, white water lines, condensate, hot and cold water lines, compressed air, ventilating, pneumatic conveying, exhaust steam lines or other service . . . you'll do better with Naylor.

Sizes from 4 to 30 inches in diameter and thicknesses from 14 to 7 gauge. All types of fittings, connections and fabrications.

NAYLOR PIPE COMPANY
1236 East 92nd Street, Chicago 19, Illinois
New York Office: 350 Madison Avenue, New York 17, N. Y.

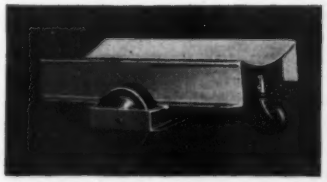


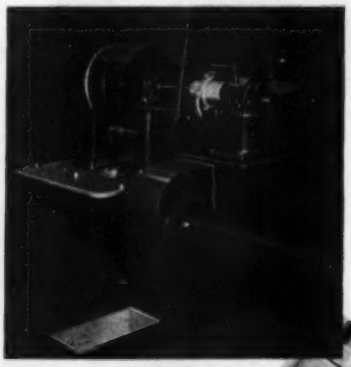
HIGH-SPEED

SUPERFINISHING EQUIPMENT

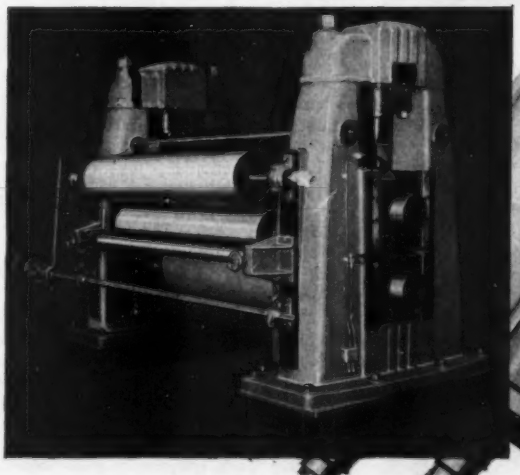
APPLETON has had long and highly specialized experience in all phases of superfinishing. Today it offers a complete line of equipment for the paper industry. Here are high-speed supercalenders in all sizes, from small laboratory models to huge stacks that take full paper machine widths. Here are the latest mechanical and electrical advancements for more efficient overall performance. Here is the most complete selection of filled rolls in America, a roll type for any paper or finish. Here are special process cotton rolls for coated stocks running at speeds up to 1800 feet a minute. Here is modern auxiliary equipment for reduced maintenance and reduced operating costs. For everything for superfinishing in the paper industry – see APPLETON first.

AUXILIARY EQUIPMENT— Unwind and Windup Stands, Friction Brakes, Special Roll Trucks, Etc. developed to maintain high-speed finishing,— high production.





EMBOSSING CALENDERS and Rolls, Special Stacks, Etc. all with the advanced Appleton features.



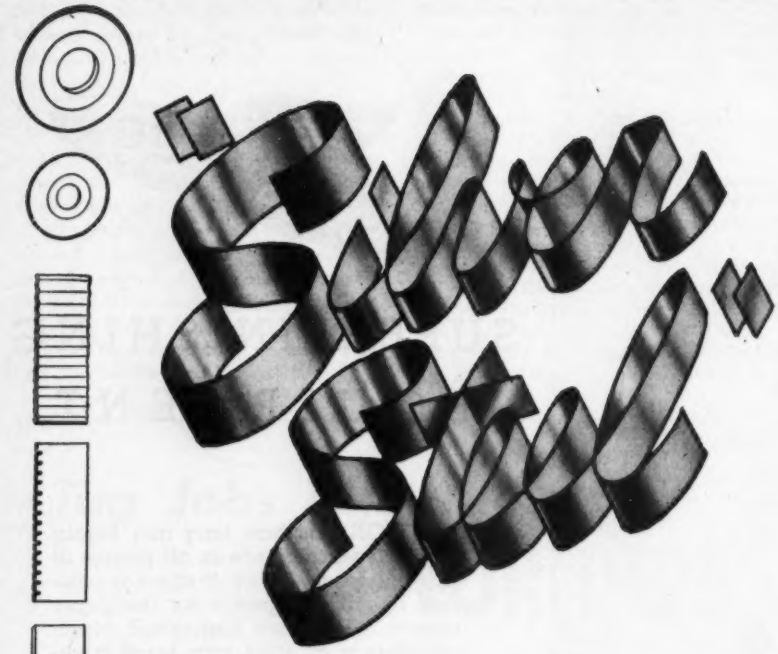
APPLETON

THE APPLETON MACHINE COMPANY

Appleton • Wisconsin

Western Sales
PACIFIC COAST SUPPLY CO.
San Francisco
Portland

Eastern Sales
CASTLE AND OVERTON, Inc.
654 Tenth Ave
New York



MARK OF QUALITY
on Slitter Knives and Rules!

"Silver Steel" is the mark — the buying guide — on the toughest, sharpest, most dependable and efficient slitter knives and rules for creasing, cutting and perforating ever made available to the paper industry — to printers, box manufacturers, carton specialists! . . . For tools that stay sharp longer, that do their jobs faster and with less attention — you can depend on dependable "Silver Steel" tools, made *only* by ATKINS.

ATKINS

E. C. ATKINS AND COMPANY
402 S. Illinois Street
Indianapolis 9, Indiana

characteristics of the pulps produced. Most strawboard mills in America have now gone over to the use of these improved cooking formulas.

At the same time, co-operative work with the strawboard mills, farm equipment manufacturers, producers of chemical preservatives, and the Technical Association of the Pulp and Paper Industry was initiated to improve the economics of harvesting, baling, storing, and preserving the straw. As a result, combine-harvested straw is now collected and baled with one-man, automatic wire-tie balers, and delivered to the mills in bales having a density of 10 pounds or more per cubic foot. Combined straw contains considerably less chaff than the binder-harvested material. Treatment with borax, as mentioned earlier, appears to be a practical solution of the preservation of uncovered straw in storage.

Fine straw pulp

A much broader field for straw lies in the production of pulps for fine and bleached specialty papers and boards. Such bleached products are in commercial production and use in Europe, South America, and the Orient, but not yet in North America. One serious drawback to straw for fine pulps and papers has been the reported low yields of pulp produced, based on its relatively low alpha-cellulose content, as compared with that from pulpwoods. When the total carbohydrate portion, the holocellulose, of straw is considered, however, it is found to be approximately equal to that obtained from most pulpwoods. Many experiments were conducted at the Northern Laboratory in attempts to develop an economic process for producing a holocellulose pulp from straw. All of the existing, well-known commercial pulping processes were also investigated with wheat straw as the raw material. As a result, it was determined that the neutral sulphite process came nearest to producing a holocellulose type of pulp, yielding approximately 50 per cent of a strong, bleached pulp, based on original straw. This pulp has strength characteristics at least equal to those of softwood sulphite pulp, except for tear resistance, a property which is almost directly correlated with average fiber length of the pulp. Many mills in Europe, particularly in Italy, are now using this process successfully.

Mechano-chemical pulping

About a year after the neutral sulphite process for straw was established, the Northern Laboratory announced the mechano-chemical process—a new and revolutionary method for producing pulps from straw in high yields with excellent strength characteristics. Using the same amounts of chemicals, based on straw, mechano-chemical pulping for coarse strawboard pulp requires cooking for only 1 hour at 96 to 100 C., as compared with 5 hours at 140 C. (40 psi) in pressure cooking. The yields and properties of the pulps prepared by these two methods are quite similar. Runs of 24- and 48-hour duration in commercial hydrapulpers have corroborated fully the results obtained with the 3-foot laboratory unit. In fact, the commercial operation was considerably better than expected from the laboratory results. One strawboard mill in the United States is seriously considering changing over to the mechano-chemical process.

In cooking straw for fine pulp, the mechano-chemical process requires only about ½ hour at 96 to 100 C. for producing an excellent kraft or soda pulp, in contrast to the 2 hours at 170 C. (100 psi), using the same amount of chemicals based on straw. The yields of the mechano-chemical kraft and soda straw pulps exceed by 6 to 8 per cent those obtained from cooking under pressure. The alkaline pulps obtained by either method are considerably stronger than neutral sulphite straw pulps and approach softwood kraft pulp in all strength characteristics except tear resistance. This new process is not applicable to wood chips or to fibrous materials having a dense woody structure. Preliminary tests have shown it to be applicable, however, to other members of the grass family such as sugarcane bagasse or cornstalks. The nodes, rachises, and seed kernels are swollen and softened but not pulped, and they are readily removed from the pulp by riffling and screening.

The mechano-chemical process produces a pulp with a higher hemicellulose or pentosan content than was present in the original straw, or in pulp produced by any other pulping method; straws containing 26 to 28 per cent pentosans give pulps about 33 per cent pentosans. Very little loss of the original alpha-cellulose occurs with this pulping process. Furthermore, the ash content of the mechano-chemical pulp is considerably below that of the same type of

pulp produced by cooking under pressure. These facts all indicate that the mechanochemical process approaches the ideal in pulping, that is, delignification with a minimum of attack on the carbohydrate constituents of the raw material.

General considerations

History proves that the progress of civilization in any part of the earth is directly correlated with the average standard of living in that particular location. It also shows that the standard of living has been increasing since ancient times, with occasional setbacks due to such natural catastrophes as floods, earthquakes, and disease, and to man-made catastrophes, wars.

Better means of communication is one of the signs of advancing civilization and improved standard of living; whether it be the cause or the result of such advance. Better communication means better education and brings people closer together. The written word or sign is probably the most important means of communication, and has been since the stone tablets in ancient times. Today, paper constitutes the essential material for education and communication.

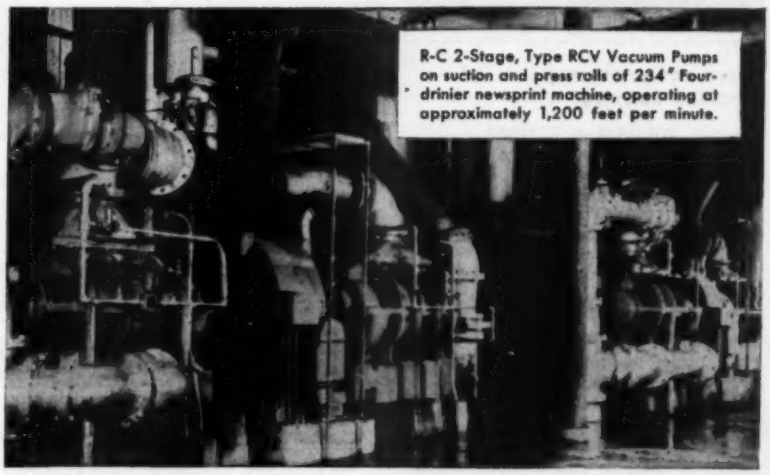
Thus, the degree to which paper or paper products is used by a nation or continent gives a fair indication of its standard of living. The United States, with probably the highest standard of living in the world today, has an annual per capita consumption of about 350 pounds of paper and board products. The estimated per capita consumptions of other areas, in order of decreasing use of these materials are: Canada 256 pounds, Northern Europe 116 pounds, Oceania 99 pounds, Continental Europe 49 pounds, Latin America 17 pounds, Africa 6 pounds, Near East 2.6 pounds, and Asia 2.4 pounds. The known low average standard of living in Asia and the Near East is confirmed by these figures.

Most of the world's pulp is produced at present from coniferous woods, which grow mainly in the North Temperate Zone. Outside of the virgin forests of Alaska and parts of Russia including Siberia, the coniferous wood stands of the world have already been reduced to a considerable extent. The present rate of cutting of these wood stands is at least equal to, if not in excess of, annual replacement growth. Now, if the world consumption of pulp and paper products were increased by 1 pound per capita, an additional 1,000,000 tons of pulp and paper products or approximately 2,000,000 tons of raw material would be required. An increase in 10 pounds per capita for the world population of 2 billion would require an additional 20,000,000 tons of fibrous raw material per year. Such an increase, which might reasonably come about in the next few years, would sorely tax the pulpwod resources of the world if the increased production came about through the use of wood.

The amounts of available straw, annually surplus to the needs of the farms, on the other hand, are more than sufficient to take care of such additional pulp and paper requirements. It seems incompatible with good economy to allow these annual fibrous raw materials to go to waste while, at the same time, the natural forest resources are being depleted. No one would think of throwing away the annual interest accruing from an investment while at the same time drawing on the investment principal for current expenses. Yet, that is exactly what is being done when wood is cut and pulped to do a job which can be done as well or better by straw or other annual fibrous residue available in excess. Again, this does not mean that straw fiber should be used indiscriminately for all papers and paper products. The various fibers should be blended so that each fiber will contribute its optimum characteristics to give a final paper or product with the desired properties.

Conclusions

It is evident from the foregoing that sufficient straw and other agricultural residues are annually available in the world to meet the expected increase in paper and board requirements for many years to come. Intelligent use of the various types of fibrous residues available can accomplish this increase in paper production without excessive drain on the pulpwood and timber resources. The expected improvements in technology from continued and increasing use of straw and other agricultural residues, should greatly advance the over-all economy of the world pulp and paper industry.


R-C 2-Stage, Type RCV Vacuum Pumps on suction and press rolls of 234" Fourdrinier newsprint machine, operating at approximately 1,200 feet per minute.

SHOPPING FOR VACUUM PUMPS?

Be sure to examine ROOTS-CONNERSVILLE'S wide line of standard sizes, fitted to your needs.

Built primarily for paper mill operation, the improved R-C Cycloidal Vacuum Pumps offer several important advantages:

High volumetric efficiencies—accurately maintained clearances, effectively sealed by water, insure high efficiencies; air being handled can be dry, or contain vapors or liquids.

Low friction losses—due to no contact between impellers or impellers and casings.

Higher speeds—permitting direct connection to standard motors, saving first cost, space and weight.

Flexibility—to meet varying vacuum requirements; suction automatically created to overcome resistance in system.

Durability and dependability—simplified design and construction for long-time, attention-free operation.

For replacements or new installations, consult Roots-Connersville about your vacuum pump requirements.

ROOTS-CONNERSVILLE BLOWER CORPORATION
509 Monroe Avenue, Connersville, Indiana

ROOTS-CONNERSVILLE
BLOWER BUILDERS R-C SINCE 1854
ONE OF THE DRESSER INDUSTRIES

For filtering its fresh water supply, the Green Bay Paper & Pulp Co. selects the NORTH Water Filter

This 6 x 8 ft. NORTH Rotary Water Filter removes debris and foreign matter from 3,000,000 gallons of raw water taken from the lower Fox River each day to supply the new semi-chemical mill of the Green Bay Paper & Pulp Co., Green Bay, Wisconsin. This is only one of a hundred such installations over the past 30 years made by the—

GREEN BAY FOUNDRY & MACHINE WORKS
GREEN BAY, WISCONSIN

Some economic aspects of machine coating*

WILLIAM A. ZONNER
St. Regis Paper Co.

Machine coated papers, in the early 30's, were in their infancy. At the time, they gave no competition to coated papers manufactured by a separate and rather expensive operation. As time passed, it became evident to papermarkers that paper could be coated at high speeds on paper machines more efficiently than by the older method.

Of course, the printing industry had to be educated to the end use of this type of paper. Here, a problem developed because the printing industry was accustomed to a sheet coated with casein; while, in most cases, the machine coated sheet is coated with starch. Also, some ink troubles were encountered. They were due to poor drying and flatness. These problems have long since been corrected; and, today, the demand for machine coated papers is tremendous.

As the demand for these papers increased, the mills had to meet increases in the price of raw materials. Clay, for example, could be purchased in the early 30's for approximately $6.00 per ton at the mines. Today, we are paying $18.00 and $20.00 per ton for the same grade. When I say "same grade" I do not mean to infer that the clay industry has not come forth with better grades. They have, and they have done a great deal toward developing the machine coated paper.

With the more expensive raw materials, the mills had to think of ways and means that they could use to keep machine coated papers competitive with clay-filled supered papers or with papers better known as "free stock papers." When I speak of machine coated papers, I am referring mostly to groundwood base sheets.

The first economical step of the industry in this direction was to speed up the paper machines and to lower conversion costs. When this step was taken, machine coated papers stepped out in the lead and have been there now for quite a few years.

Due to the price of machine coated papers and their value on multi-color printing, a very competitive market developed in the printing industry. This competition led the printers to lower their printing costs. They did so by putting in wider presses, also presses which would run up to 18,000 and 20,000 signatures per hour.

This situation brought a repercussion on the paper industry. The mill which had equipped itself to furnish printers with 48-in. rolls found the printers demanding 60-in. rolls. Thus, machine coated paper manufacturers have been forced to go to the widest trim machines possible. Today, these machines go up to as high as 225 in. trim. In fact, most of the mills are being put in a position to handle full width trim in their supering operations. By so doing, they are able to cut most any size roll which a printer may desire.

In some cases, individual companies made the very bad mistake of installing coating equipment on small paper machines. Such installations are now handicapped to meet the trim demands; and, of course, are very expensive to operate.

In comparing a machine coated operation with an off machine coater, you find considerable savings in manpower. Also, there is a material saving which formerly was lost in the handling of the base stock from the paper machine to the coating machine.

Considerable difficulty can be experienced with machine coaters if the furnish is not adopted to this kind of operation. We find it much more profitable to keep up our sheet strength so as to get good mechanical performance on a paper machine.

There should be no unnecessary delay in equipping your coating machines with automatic stopping devices. They are needed to eliminate all possible wrap-ups. These wrap-ups are very injurious to the rubber rolls.

Several different designs of coating machines have been developed to operate as a part of the paper machine. In connection with this equipment, the use of chromium rolls, wherever possible, has been proven advantageous. This arrangement tends to elimi-

(*) Abridged from a paper read before the 31st annual convention of the American Pulp and Paper Mill Superintendents Association, Inc., held at the Edgewater Beach hotel, Chicago, June 8-10, 1950.

ENGLISH ECCO CLAYS TRADE MARK **CLAYS**

UNIFORM • SUPERIOR • DEPENDABLE

English China Clays Sales Corporation
551 Fifth Avenue, New York City

THE LEWELLEN AUTOMATIC CALIPER CONTROL

for paper board mills

OVER 100 MODERN PAPER MILLS DEPEND ON THIS LEWELLEN CONTROL TO MAINTAIN UNIFORM CALIPER. Twenty-seven years of continuous service! That's exactly the score for a number of Lewellen Automatic Controls in paper mills the country over. They operate at any machine speed. They AUTOMATICALLY CORRECT ANY VARIATIONS IN CALIPER due to changes in stock consistency, machine speeds, screen stoppage, or any other cause. They are installed without interrupting production under supervision of Lewellen engineers.

This Lewellen Automatic Caliper is the heart of the Lewellen Automatic Thickness Control. It operates successfully on board thicknesses of from .010" to 1.375" . . . By the makers of the famous Lewellen Variable-Speed Transmission and Variable-Speed Motor Pulley.

LOOK TO LEWELLEN

Phone, wire or write
LEWELLEN MANUFACTURING CO.
COLUMBUS, IND.

For effective advertising to the world's paper users— use the—

★ PAPERMAKERS'

& Merchants'

DIRECTORY

of All Nations

Reserve your space now. Full details from the **Advertisement Manager, 180 Fleet Street, London, E.C. 4 England**

nate all possible damage due to paper breaks. Modern paper machine drives are of great advantage here. They are very well synchronized and of themselves make for a minimum of breaks.

Tissue machine coatings*

JOHN E. BURDSALL
Assistant Superintendent
Crystal Tissue Co.

Some of the problems encountered on various positions on single cylinder and M.F. fourdrinier tissue machines, primarily from a maintenance standpoint, will be outlined. No attempt will be made to cover the important points in putting on wires or felts or to cover general operating procedure.

There is a great temptation to be too specific, cite examples of a particular failure, and to give the reasons for it. More often than not, after a period of abnormal felt or wire life, a check of the records will show at least two and possibly several changes were made before the trouble disappeared. For that reason, very few positive statements can be made. Most of the points to be brought out are open to discussion.

Both single cylinder and fourdrinier tissue machines are being operated in the mill of the Crystal Tissue Co. with the Hawley Fuller pick-up attachment. This set up involves the use of cylinder wires, fourdrinier wires, cylinder wets and pick-ups, fourdrinier wets and pick-ups, and dryer felts.

Starting with cylinder wires, consideration should be given first to the molds which they cover. Someone in this group might like to comment on what should be done, and, what should not be done, in the choice of metals for molds for particular kinds of covers.

Another question might involve the winding wire and the supporting rods. Is it good business to rewind molds comparatively often? When does that maintenance cost become unjustified? Is there any good way to determine when the cost of turning rods or replacing them is justified?

The life of a cover is affected adversely by physical damage. This damage generally is of an accidental nature, such as bumping or rubbing. It also is affected adversely by filling up and by improper cleaning with souring chemicals and in blowing clean with steam. Wires have been ruined when the inside of a steam hose let go. A rough or unsatisfactory deckle likewise can cause trouble.

When wrinkling occurs, it presents a serious problem, mainly because conceivably it can result from so many different conditions. Improper alignment and offset of the couch, end play in the couch, drag on the mold, an unsteady drive, and improper shower application are just a few of the things that may be suspected. There certainly must be many others; and it would be interesting to hear about them.

The wet felt on a single cylinder tissue machine has a multiplicity of purposes. It

(*) Abridged from a paper read before the 31st annual convention of The American Pulp and Paper Mill Superintendents Association, Inc., held at the Edgewater Beach hotel, Chicago, June 8-10, 1950.

acts as a belt in driving the mold. It couches the sheet off the mold. It allows for water removal through the suction boxes. It transfers the sheet at the press to the pick-up felt.

The wet felt must be rugged enough to run, and open enough to avoid crushing. Is it any wonder that good life in a wet felt is difficult to attain?

Certain basic things are essential to good wet felt life: all rolls must be in alignment; all bearings must be in good condition. The press rolls must be ground properly. The suction boxes must be kept smooth. (I am sure we could have some good discussion on the best type of suction box.) The whipper, if not in good condition, certainly could contribute to poor felt life. The slice board, if allowed to get out of position, can play havoc with a felt. The showers must be designed for the water they are handling and a water pressure suitable for their operation must be available.

Wet felt life definitely is related closely to these several factors. If it were possible to devise a graph or chart showing the effects of each factor separately and collectively in all combinations, it would be extremely interesting.

The cylinder pick-up or top felt presents a set of problems different from those of the wet felt. Its function is to transfer the sheet from the wet felt to the pick-up dryer. Actually, from the standpoint of operation, it probably is the more difficult felt to handle; but, from the standpoint of service, it presents no continual problem.

The fourdrinier pick-up felt couches the sheet directly off the wire. It carries the sheet through the press and to the pick-up dryer.

The operation of a fourdrinier pick-up felt is a delicate one; but its life is reasonably good. In straight fourdrinier operation, the pick-up felt transfers to a cold dryer. On a Yankee machine, it transfers to a hot dryer. In the latter case, water removal becomes more of a factor. For that reason, a pick-up felt on a straight fourdrinier gives several times the life of its counterpart on a Yankee.

The term fourdrinier wet felt applies to the felt which cushions the sheet in the press. That is its only function. So long as it remains clean and open, no difficulty is encountered. In our operation we run no shower, squeeze rolls, or whipper on this felt, but rely on a suction roll and a Vickery conditioner to keep it clean.

Here are a few thoughts on the various types of felts as a group:

At the present time, we do not wash or turn any felts.

There are many good washing compounds on the market. We have tried a lot of them. They do clean felts and make them soft as though they had just been put on a machine.

We have washed felts in an attempt to eliminate crush marks. Invariably we found that, if a felt once filled up, no amount of washing would prevent the crushing from occurring again after a short running time.

All mills have a water problem of some kind. Our problem is one of hardness. Our well water is very hard.

I understand that there are products on the market that tend to keep the lime in solution. Has anyone present had any experience with any of them? I am thinking of them in relation to quality of water for wet felts.

We all know something about bacterial action on felts, either through the literature, through the vigilance of the felt salesmen, or through the reality of experiencing some of it.

Fourdrinier wires in fine mills probably are just as liable to wrinkles, ridges, holes, cracked edges, slack edges and all other special difficulties as they are in tissue mills. Because of their importance, they probably are given the best maintenance possible in all mills. This subject is one where design, and by that I mean size of mesh, may be discussed. There, of course, is a definite range in mesh in which a wire on a given machine must operate, depending on the type of sheet the machine is making. Also, a clean wire is essential for a good sheet. Therefore, is there any possibility that by using a coarser wire, still in your range, the larger openings are less likely to fill up.

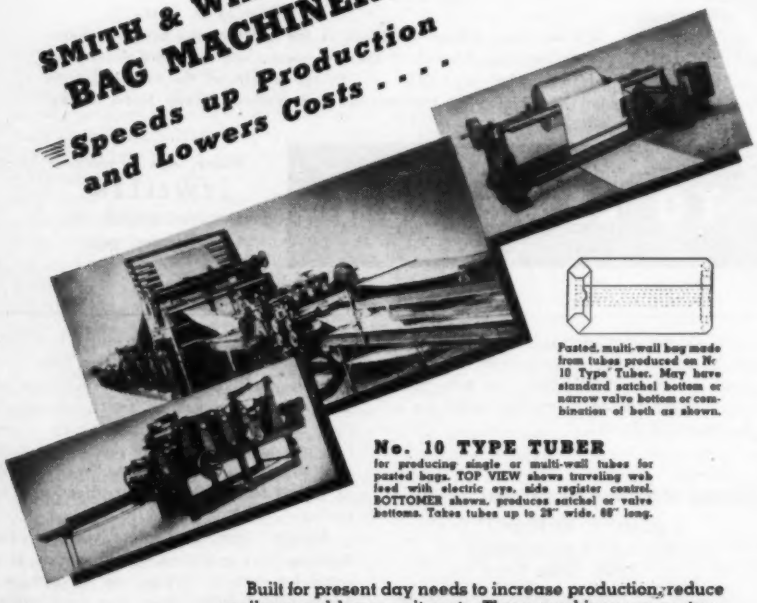
On this same problem of keeping a wire clean, how far can mill operators go in raising the shower pressure before it has an adverse effect on wire life?

Suction box covers can provide interesting discussion. In our mill, we use plain maple covers. In the past, we tried end grain maple and Micarta. Difficulty was experienced with both of these latter products. This difficulty probably was due principally to our lack of correct means of keeping them smooth.

There certainly are a lot of different types of suction box covers on the market. Some-

(Turn to page 666)

SMITH & WINCHESTER
BAG MACHINERY
Speeds up Production
and Lowers Costs . . . .

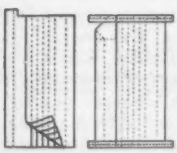


Pasted, multi-wall bag made from tubes produced on No 10 Type Tuber. May have standard satchel bottom or narrow valve bottom or combination of both as shown.

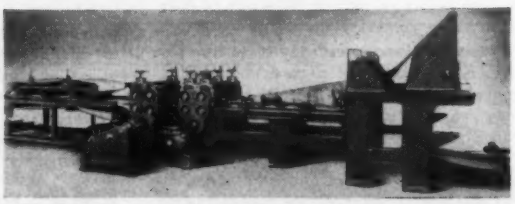
No. 10 TYPE TUBER

for producing single or multi-wall tubes for pasted bags. TOP VIEW shows traveling web feed with electric eye, side register control. BOTTOMER shown, produces satchel or valve bottoms. Takes tubes up to 28" wide, 60" long.

Built for present day needs to increase production, reduce spoilage and lower unit costs. These machines are custom-made to your requirements and will give continuous, trouble-free service. Increase your profits by speeding up production with Smith & Winchester equipment.



Multi-wall, sewed valve type, gusseted tube made on Smith & Winchester Multi-wall Tuber.



S & W MULTI-WALL TUBER

Up to 100,000 valve notch tubes each 8-hour day may be produced on this Multi-wall Tuber for sewed valve bags. One to 6 walls. Machine built in 2 sizes, 20" and 26" face. Up to 6" gussets. Tubes 26" to 50" long. Improved cross pasting units, photo-electric compensating drives and flying splice paper roll stands can be furnished.
If you have a bag problem write us.

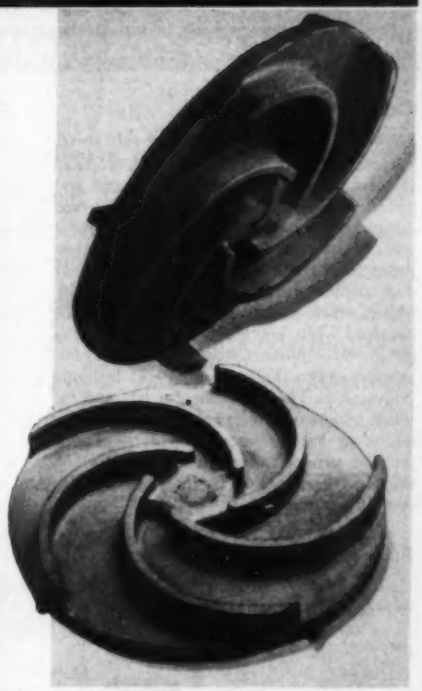
THE SMITH & WINCHESTER
Manufacturing Company
South Windham, Conn.

SERVING THE PAPER INDUSTRY SINCE 1825

MISCO *Stainless Steel* CASTINGS

CORROSION RESISTING · HEAT RESISTING · WEAR RESISTING

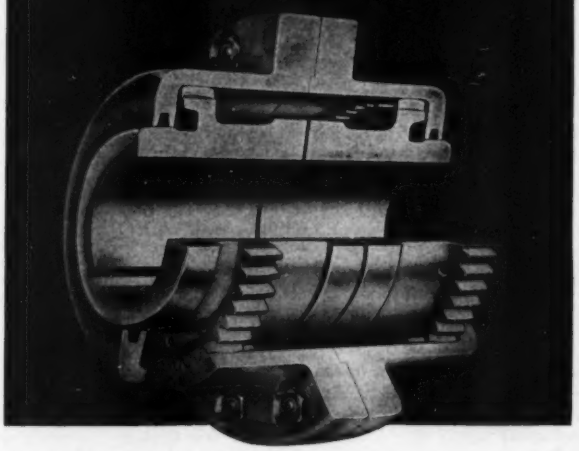
Twenty-five years ago Misco introduced stainless steel castings to the American Pulp and Paper Industry. These pioneer castings, consisting of digester neck rings and bottom sleeves, are still in active service. They demonstrate the worth of Misco Stainless Steel Castings used in pulp and paper production. To pulp and paper manufacturers Misco offers a wealth of accumulated experience gained through years of development and research. You are invited to make use of this knowledge by freely consulting Misco for your present or future requirements. PROTECT YOUR INVESTMENT BY SPECIFYING MISCO



CENTRIFUGALLY CAST STAINLESS STEEL PIPE AND TUBES
LARGE AND MEDIUM WEIGHT STAINLESS STEEL CASTINGS
CENTRIFUGAL CASTINGS

ALLOY CASTING DIVISION
Michigan Steel Casting Company
MISCO Heat and Corrosion Resistant Alloys
1999 GUOIN ST. · DETROIT 7, MICH.
One of the World's Pioneer Producers and Distributors of Heat and Corrosion Resisting Alloys

POOLE

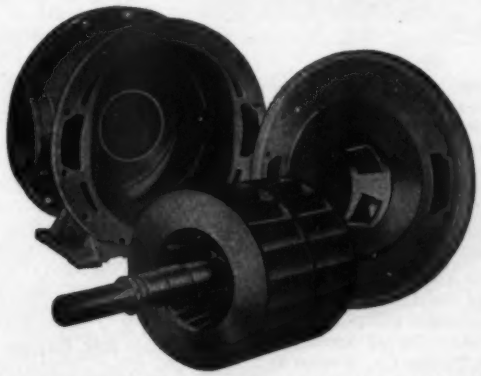


A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

FLEXIBLE COUPLINGS

POOLE FOUNDRY & MACHINE COMPANY WOODBERRY, BALTIMORE, MD.

SIMPLICITY



NASH VACUUM PUMPS HAVE ONE MOVING PART

Operating advantages made possible by the Nash principle, and present in no other type of vacuum pump, permit a new level of operating economy. Nash Vacuum Pumps have but one moving part, a rotor cast in one piece, and revolving without metallic contact. There are no valves, no pistons or sliding vanes, no internal parts requiring wear adjustment or lubrication.

NASH ENGINEERING COMPANY
SOUTH NORWALK, CONNECTICUT, U. S. A.

The Paper Industry New Products

Carton Press

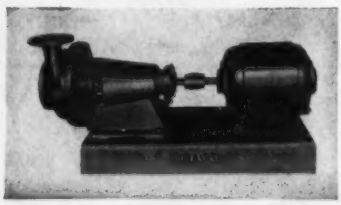
Higher production in handling roll stock.

Designed as an independent unit, economy features of this stationary carton cutter and creaser are claimed to include more cartons out per lb. of paper, elimination of need for gripper space, reduction of edge trim, lower paper costs and easier handling of stock.

A double roll stand is standard equipment, which means that one roll can be mounted while another is running, assuring practically uninterrupted production. For average carton designs, automatic stripping is available. The unit can also be used for inline production with rotogravure, aniline-anilox or letterpress equipment to provide finished, printed cartons in one pass through the press. Champlain Co., Inc., 88 Llewellyn Ave., Bloomfield, N. J.

Process Pumps

Can be converted from open to closed impeller or vice versa.



These pumps are designed for general service applications in the process industries that require handling hot or cold clear liquids, viscous liquids, corrosive liquids or liquids carrying suspended solids. Units are furnished with mechanical seals or conventional packing, and vane characteristics and materials of construction can be selected to suit requirements.

Parts are standardized so that only two sizes of shafts, shaft locknuts, bearings, bearing cartridges and pedestals are needed for the entire line of seven sizes. De Laval Steam Turbine Co., Trenton 2, N. J.

Safety-Relief Valve

All parts are machined from forged bar stock.

Known as Type 2745, the valve is supplied in stainless steel, steel and brass, with a choice of orifice sizes, for pressures up to 10,000 lb. and, according to the company, has a coefficient of discharge equal to that of a nozzle discharging direct to atmosphere.

Features include a new lower blow down ring, self-aligning flat disc and long spring for close adjustment. Full capacity is obtained through high disc lift, developed by utilizing the full force of the nozzle flow. Farris Engineering Corp., 521 Commercial Ave., Palisades Park, N. J.

Current Controller

For throttling control service.

CONO Model "EB" pneumatic current controller can be used in control systems for the ultimate control of temperature, flow, speed, *p*H, etc. Among principal uses would be temperature control of electric furnaces and drying ovens, temperature control on electrically heated stills and columns in pilot plants and laboratories, etc.

The controller utilizes a standard electrical component modified for continuous throttling control service, and the new Cono pneumatic cylinder operator which includes an integrally mounted positioning device to provide accuracy and sensitivity of positioning to within 1/500 part of its total travel. Conoflow Corp., 2100 Arch St., Philadelphia 3, Pa.

Air Pumps

Dry lubricated—eliminating discharge oil vapors.

Class 23 Series air pumps are claimed to be suitable for almost unlimited types of operation, although originally designed for specific application to the packaging and printing machinery fields.

Absence of contaminating oil vapors results in substantial savings in time and materials as well as health. The displacement blades furnish their own lubrication, and take up their own wear.

The pumps are designed for operation at 1750 rpm, so that they may be direct connected to electric motors of this standard speed. Capacities range from 5 cfpm to 20 cfpm, for single units; larger capacities by group drive.

Some of the applications where these units are adaptable are suction feed or pick-up of paper, cardboard, tin, etc.; filling of containers, bags, bottles, tubes, etc.; automatic handling on conveyor systems; printing presses and vacuum printing frames; vacuum priming of centrifugal pumps; and vacuum filtration. The Kraissl Co., Hackensack, N. J.

Gear Speed Reducers

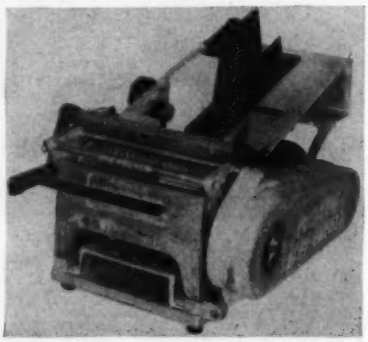
Shafts turn on high capacity anti-friction bearings.

Herringbone gear speed reducers, available in single, triple and double reduction units of from ½ to 1,000 hp., with center distances from 4 in. to 36 in., are designed to make the most of the inherent reliability and ruggedness of well made herringbone gearing. Output bearings of standard torque unit are designed to carry medium overhung loads. Overhung load type units use double-row tapered roller bearings. Gears are made of electric steel castings or high carbon steel forgings.

Conveyors, generators, blowers, pumps, machine tools, cranes, hoists, agitators and similar type equipment can be powered through these speed reducers. De Laval Steam Turbine Co., Trenton 2, N. J.

Label Paster

Accommodates labels up to 5½ in. wide.



With the semi-automatic feed label paster, labels are stacked in an adjustable hopper and the operator, by touching the feed actuator with the back of either hand, causes one label to be fed through the machine automatically. The label picks up a coating of adhesive and is delivered to the operator's fingertips. Amount of adhesive applied to the label is controlled by a dial regulator.

The machine measures 7¾ in. wide x 11⅛ in. long, and is equipped with a 1/20 hp motor. It can be furnished as an attachment to Potdevin machines already in use. Potdevin Machine Co., 1285 38th St., Brooklyn 18, N. Y.

Money-Saving Tip from *Kalamazoo*

"LINE OLD TANKS WITH KALAMAZOO GLAZED TILE"

It isn't always necessary to replace old concrete tanks that are pitted and letting sand get in your stock. Such tanks make an ideal base for Kalamazoo Glazed Tile. Gives you a "new" tank *at low cost* that will last for years and years without attention. Tile lets you modernize your chests and improve agitation with midfeathers and rounded corners. Write for full particulars—no obligation, of course.

Kalamazoo TANK and SILO COMPANY

927 HARRISON STREET KALAMAZOO, MICHIGAN

SULPHITE PULP MILLS

Screen Plates are one of your lowest "cost-per-ton" items, yet they MAKE or BREAK your quality.

Equipped with **Fitchburg NEW TYPE—DUPLEX SLOT** plates, your screens will give maximum production of cleanest pulp.

Especially designed to eliminate "strings," slime and plugging in the slots.

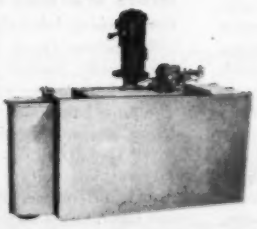
Furnished in "Fitchburg" corrosive-resistant Bronze, plain or chromium plated.

FITCHBURG
Screen Plate Co., Inc.
301 South Street
Fitchburg
Massachusetts

DeZURIK POINTS WITH PRIDE

WEST VIRGINIA PULP & PAPER CO. HAVE INSTALLED A TOTAL OF MORE THAN SIXTY DeZURIK CONSISTENCY REGULATORS IN THEIR VARIOUS MILLS!

Year after year, **repeat orders** from North America's outstanding pulp and papermakers are adding to the proof-of-performance of DeZurik Consistency Regulators.



DeZURIK SHOWER CO.
SARTELL, MINNESOTA

Standardized Heat Exchangers

Feature all-cuprous, removable tube bundle construction.

Originally designed for service on combat vessels, these exchangers, designated as Type BCP, are now being put to increasingly wide use on many types of equipment and in many process applications where operating conditions, or preference, demand a floating head, removable tube bundle unit of copper and copper alloy materials throughout.

It is claimed that the exchangers are economical units because their life is long, operating efficiency is high, maintenance and depreciation low, and time in actual service unsurpassed. Ross Heater & Mfg. Co., Inc., 1407 West Ave., Buffalo 13, N.Y.

Register Controls

Consist of 2 panels.

One-way cut-off register controls are designed to solve the problem of accurately and automatically cutting a web of preprinted material so that printed matter consistently appears at the proper point.

The controls are used where low to medium web speeds and medium accuracies are involved, and are applied to wrapping machines and small bag-making machines where the web is either underfed or overfed with respect to the speed of the cutter.

Panels include voltage regulator tubes to compensate for variations in line voltage, and have built-in light source power supplies. Only two panels are required to perform a range of applications where heretofore five were needed. They can be serviced without disturbing the operation of the control. General Electric Co., Schenectady 5, N. Y.

Gravity Feed Oiler

Automatically supplies a measured amount of lubricant to bearings.

Oilers, equipped with new ratchet control mechanism that provides instant adjustment of the oil feed, are available in 1, 2, 4 and 8 oz. capacities. Exclusive dual-purpose vent relieves suction and back pressures caused by tight bearings, high speeds, etc. and provides an overflow when feed is set too fast. Oil is visible through shatterproof, reinforced plastic reservoir.

These units are self-closing, with dustproof filler caps, and all metal parts are plated to resist corrosion. Trico Fuse Mfg. Co., 2948 North 5th St., Milwaukee 12, Wis.

Pressure and Temperature Recorders

As many as four measurements may be made at one time.

Temperature measurements by the self-actuated tube systems of the gas-filled, vapor tension and liquid-filled types for ranges from –100 F. to –800 F. are offered with this line of pressure and temperature recorders. The new case design accommodates up to four pens and provides storage space for 200 charts and 4 bottles of ink. Chart changing and pen filling can be performed easily with no chance of applying the wrong chart. Penn Industrial Instrument Corp., 3116 N. 17th St., Philadelphia 32, Pa.

Fork Lift Truck

10,000 lb. capacity, yet compact and highly maneuverable.

This gasoline powered fork-lift truck, known as Utilitruc-100, is equipped with the Dynatork drive. Engine power is transmitted through a magnetic field, across an air gap, thus eliminating need for any type of friction clutch. The conventional transmission is also eliminated and replaced by constant-mesh forward-and-reverse gearing.

Easy steering, maximum driver comfort and visibility, unusual maneuverability and ease of operation with elimination of stresses and strains characteristic of rigid frame-mounting are other advantages claimed for the new machine. Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.

Stainless Steel Filters

Offer high efficiency in passing fluid—retaining solids.

The Surfamax porous stainless steel filter supplies a maximum filter area in a convenient container, giving continuous service with a minimum of maintenance expense and attention. The positive operation claimed by the manufacturer may also be completely automatic.

Unit is in the form of a corrugated assembly, having the general shape of an accordion. Available in six pore openings, it offers uniform pore sizes, closely limiting the size of the particle which can pass through the filter. Standard units with pipe connections range from ¼ in. to 2 in. Micro Metallic Corp., 193 Bradford St., Brooklyn 7, N. Y.

Glass Washing Detergent

For washing laboratory glassware by hand.

Wyandotte Dural H is claimed to penetrate rapidly, protect glassware and workers' hands, and reduce etching to a minimum. The same advantages are gained with Dural M for machine washing of laboratory glassware. These products are claimed to be ideal for washing culture and test tubes, Petri dishes, Erlenmeyer flasks, centrifuge tubes and laboratory glassware of all kinds. Wyandotte Chemicals Corp., Wyandotte, Mich.

Vent and Drain Valve

Ball-type seating mechanism used instead of customary disc.

By using a simplified ball-type seating mechanism, the company claims that more accurate seating and longer life of its automatic vent and drain valve is assured. The unit can be installed in water or oil piping systems to remove entrapped air, or in compressed air systems to remove water and oil. Operation is fully automatic.

Sizes are available to take care of all air requirements up to 150 lb. psi., and water up to 125 lb. psi. Crane Co., 836 So. Michigan Ave., Chicago 5, Ill.

Vinyl Resin Coating

May be brushed, sprayed, roller coated, knife or bar coated.

Designated Geon 2000 X 20, is a vinyl-vinylidene chloride copolymer claimed to be unique among commercial vinyl resins because of its solubility directly in toluene, xylene, and high aromatic naphthas. Solutions ranging up to 50% total solids content can be prepared readily with the product by slowly adding to a solvent at ambient temperatures with rapid mechanical agitation; it is also claimed that even high solids solutions cooled to 0 C. and rewarmed to normal room temperature, will recover original viscosities with no gelling. B. F. Goodrich Chemical Co., 324 Rose Bldg., Cleveland 15, Ohio.

Turret Trucks

Operator may either ride in a standing position or walk alongside.

The turret line of trucks seems to meet requirements for horizontal materials handling. Powered by a Wisconsin air-cooled engine, traveling up to 8 mph when fully loaded, each truck is equipped with the Sailsbury fully automatic clutch and transmission, and is fully maneuverable. Speed is regulated by means of a throttle ring located inside the steering wheel.

Almost any type of load up to a capacity of 4,000 lb. may be handled by these trucks. Hyster Co., Portland 8, Ore.

Industrial Heating Unit

Tempers make-up air where ventilating systems impose heavy loads on heating plants in cold weather.

Thermobloc direct-fired heating units placed along walls of rooms which lose air through ventilating systems eliminate the necessity of the entrance of cold air through doors or windows by replacing air volume with outside air brought in through ducts to be pre-heated before entering the room. Thermobloc can temper make-up air whether it is used as a plant heating system or as an auxiliary unit to lighten the load upon the main heating unit. Prat-Daniel Corp., 845 S. Water St. East Port Chester, Conn.

Humidity Indicator

Pocket size for convenience.

Shorter than a pencil, this new instrument shows relative humidity by the accurate wet-and-dry bulb method. Known as the Pocket Humidicator, this new instrument

POSITION WANTED: Personnel Director—20 years experience with large pulp and paper manufacturer—Middle Atlantic Coast or New England preferred. Address: Box 501, The Paper Industry.

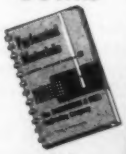
POSITION WANTED

SALES EXECUTIVE—48, Member TAPPI, SAPI; wide acquaintance with publishers, converters, merchants, printers. Experienced book, bond, coated, groundwood, sulphate. Capable manager. Personable and aggressive. Available October 12. Address: Box 503, The Paper Industry.

STOP Screen Clog Slow Downs

H & K PERFORATED METALS

Perfect perforations for paper processing. No tendency for screen to choke, clog and slow-down production. H & K perforations are perforated clean, smooth and accurate, uniform to tolerances as close as ± .0005". Bull, chip, pulp, digester, or bottom screens of stainless steel, corrosive-resistant alloys. all types of metal . . . all gauges. If you like . . . rolled, formed, pre-fabricated to your specifications.



Ask for Catalog 62.

The Harrington & King Perforating Co.

5654 Fillmore Street, Chicago 44, Illinois
114 Liberty Street, New York 6, New York

GRINDERS

MACHINE KNIFE • SAW
FACE • CARBIDE SAW
BENCH • SURFACE

SAMUEL C. ROGERS & CO.

192 DUTTON AVE.
BUFFALO 11, N. Y.

Is Your Paper Proud of its Complexion?

MANY pulp and paper products turn up with streaks and spots on their faces. If that's happening to your paper, you may be sure your process water is at fault. Color, iron, dirt and other impurities that spoil the complexions of even the best papers can clog your machinery and cut your out-put, too!

Permutit Equipment Gives You Complete Control of Water Quality

Whatever your local water conditions, Permutit equipment assures you of soft, chemically correct process water at all times. And that's your best assurance of paper that can be proud of its complexion. Production runs more smoothly, too, with soft water.

Write for full details about this low-cost equipment to The Permutit Co., Dept. PI-9, 330 West 42nd Street, New York 18, N. Y., or to Permutit Company, Ltd., 6975 Jeanne Mance Street, Montreal.

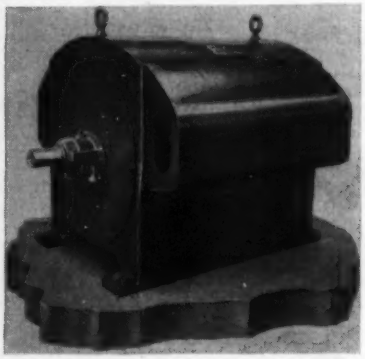
Water Conditioning Headquarters for Over 37 Years

PERMUTIT

can be used either in the hand or mounted on a wall. A built-in slide rule converts the wet-bulb and dry-bulb readings direct into relative humidity. The Humidicator consists of two etched scale glass thermometers, individually hand-calibrated. The psychometric slide rule forms the cover of the white plastic case. Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.

Splash-Proof Motor

Withstands severe outdoor service.

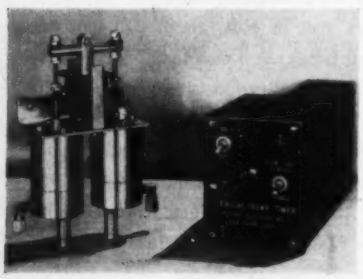


Splash-proof motors for use in outdoor steam generating stations and open air process plants are built in sizes from 150 to 2000 hp., 4 to 14 poles. Special moisture resisting varnish provides protective coating against rust for interior metal parts. The all steel stator frame and bearing brackets are shot blasted and coated inside and out with rust-inhibiting finish during fabrication. Mechanical joints are carefully sealed when motor assembled to prevent moisture entering.

Either sealed, split, ring-oiled, sleeve or antifriction bearings are available on this new Elliott motor. Elliott Co., Ridgway Div., Ridgway, Pa.

Metering Pump

Operated by an electronically controlled solenoid



Accurate, variable control of the number of strokes per unit time is inexpensively provided with this remote-controlled pump. Length of stroke may be adjusted to a maximum output of 0.8 cu. in. per stroke. No stuffing box adjustments or periodic maintenance are required once the unit is installed, as it has a special mechanical sealing arrangement and all working parts are self-lubricated. Eastern Industries, Inc., 296 Elm St., New Haven 6, Conn.

New Product Briefs . . .

▶ HAND PADS—Long wearing hand protectors have snap-fastened straps to keep pads on and are made for handling brick, tile, metal sheets, cartons, paper, and for other uses where hand injuries are a risk. Made of toughest horsehide with adjustable leather strap. General Scientific Equipment Co., 27th & Huntingdon Sts., Philadelphia 32, Pa.

▶ HYDRAULIC SHEET FEEDING TABLE—Compound lever arrangement makes possible a low height and greater range of elevation. Features a vertical lifting arrangement. Unit is offered with a two speed foot pump, but a power operated pump with either push-button or foot switch control is recommended for faster elevation. Lyon-Raymond Corp., 8067 Madison St., Greene, N.Y.

▶ DIAL THERMOMETER—This Tempoint dial thermometer is designed for fast, accurate thermal response. Temperature indicating element is a bi-metal coil, and indicates temperatures from 200 to 1,000 F. Exceptional readability is claimed due to the long, V-shaped pointer which is colored bright red. Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh 8, Pa.

▶ LOCKING NAIL—ES-nail provides a simple means of attaching wood or asbestos shingles directly to gypsum or insulation sheathing. Fastener has two legs, one enclosed in the other, hinged near the end and forming a triangular loop at the head. Last blow of hammer causes clinching action. No special tools required. Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd, Union, N. J.

▶ SELF-PRESSURE TORCH—This half pint torch is available for either gasoline or alcohol, and is practical for a wide variety of indoor home uses, light shop work, or hobbycraft work. An outstanding feature is the fact that it is complete with soldering iron rests and windshield. Torch will burn 3½ hrs. full open at a temperature of 1700 deg. by pyrometer reading. Turner Brass Works, Sycamore, Ill.

▶ POCKET MICROSCOPE—Improved 10 power Hastings Triplet pocket microscope is for quality control and general plant use for visual inspection of pulps, fibers, paper, threads, dyestuffs, textiles and raw materials. For protection against attrition and chemicals, the 3 cemented lens elements are mounted in a hard finished aluminum lens cell protected by a stainless steel frame. Strates Instrument Co., 1861 Hillhurst Ave., Los Angeles 27, L. A.

▶ LEVEL INDICATORS—Direct reading illuminated level indicators have many uses and flexibility in a wide range of applications. Changes in levels from any source, from any remote point, are visually reproduced on a graduated illuminated dial scale on the face of the instrument. Panalarm Products Div. of Panellit, Inc., 7218 N. Clark St., Chicago 26, Ill.

▶ FLEXIBLE STAINLESS STEEL HOSE—This corrosion resistant hose withstands cycles of vibration, flexation and variplane motions. It is fabricated in sizes from 5/16 in. through 6 in. ID in one or multiple ply construction. Available with helical or annular corrugations, with or without braid covering, depending upon pressure and other factors of service use. Chicago Metal Hose Corp., 1304 So. 3rd Ave., Maywood, Ill.

▶ NON-COLLAR BUSHING—Magic-Grip non-collar bushing has radially adjusted setscrews and is especially designed to allow maximum bores in the smaller pitch diameters. It is released easily and quickly by loosening the capscrews and using two of them as jackscrews. Allis-Chalmers Co., Milwaukee, Wis.

▶ CONTROL DEVICE—Called a flow interlock, this device closes an electrical contact when a flow of water exceeds a preset amount and opens it when the flow falls below the preset amount. It acts as a fuse in a circuit which depends upon water cooling for protection. Can be used in hot water heaters, welding units, kitchen waste units, transformer cooling, induction heating, water-cooled dynamometers, etc., it is claimed. General Electric Co., Schenestady, 5, N.Y.

▶ ELEVATING PLATFORM—New platform utilizes standard air pressure of 90 to 100 lb. psi. for lifting capacities up to 300 lb. It lowers to 6 in. and elevates to 42 in. For simple installation below floor level. Lyon-Raymond Corp., 8068 Madison St., Greene, N.Y.

▶ SOLENOID VALVES—Designed for hard-to-handle liquids and gases, the solenoid valves are hand-made and engineered for precision seating, insuring tight shutoff and trouble-free operation for the life of the valve. These new units are mounted vertically, with the solenoid on top. Charles Engelhard, Inc., 850 Passaic Ave., E. Newark, N.J.

Tissue machine coatings

(Continued from page 660)

one may like to say something about any one of them.

It would be interesting to have someone talk about welding patches on wires. I have heard that this procedure is followed in some mills with great success. Occasionally, we have been able to salvage a little extra life by patch welding. Nevertheless, in our grades, the surest answer is usually a new wire.

One other item of clothing is the dryer felts. We use cotton felts; and, barring accidents, we get long runs out of them. However, they are very easily ruined if allowed to run too wet.

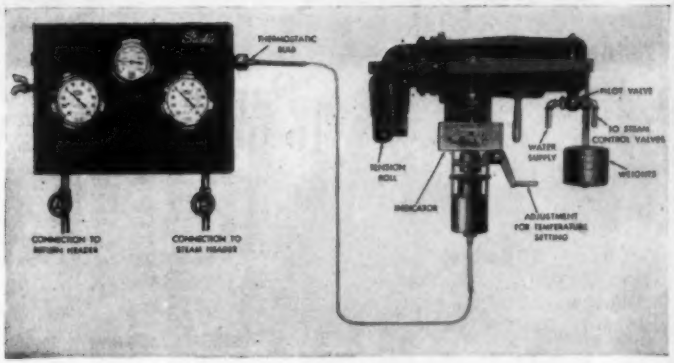
We have heat lamps on some of the dryer felt areas that tend to run wet. These lights will burn a felt if they are left on when the felt is not running.

In dryer felts, there is a choice of cotton or asbestos, or a combination, and a wide choice in the type of seam. We use a glued seam, and find it very satisfactory.

The life of felts and wires is a cost problem. It is not a quality problem. Quality is maintained by putting on of new felts and wires when needed. The cost is the record of the ability of the operator to cope with the problem.

Moisture is Money

—when correctly controlled!



Moisture content of paper *cannot* be successfully set by guess and by gosh. But Stickle can set it for you—automatically—and maintain it throughout your operations *at the most profitable level for you.* Applied to your driers, Stickle Automatic Tension and Thermal Control (illustrated) *accurately* controls sheet moisture within one-half of 1%—actually permits 2% *more* moisture content than normal.

In addition, Stickle Control stabilizes steam flow to your machines . . . checks overheating of your driers . . . eliminates manual control to the greatest degree. You can count the results right in your pocket—*lower fuel costs, fewer rejects, consistently higher quality of product.*

But get *all* the details. Send for free bulletin below.

FREE! Illustrated, 24-page Bulletin No. 160, describing Stickle Automatic Tension and Thermal Control and other cost-cutting paper mill equipment. Send for your copy!

STICKLE EQUIPMENT

Stickle Steam Specialties Company

2215 Valley Avenue • Indianapolis, Indiana

SULPHITE MILL ACID PLANTS

SULPHUR BURNING PLANTS
JENSSEN TWO TOWER ACID SYSTEMS
GAS COOLERS—SURFACE AND SPRAY TYPE
JENSSEN PRESSURE ACID SYSTEMS
JENSSEN AUXILIARY PROCESS TOWERS
RECOVERY PLANTS—COOKING ACID
SOLUBLE BASE ACID PLANTS
SEMI CHEMICAL PLANTS
JENSSEN SO_2 ABSORPTION SYSTEMS
FOR BLEACH PLANT APPLICATION
SULPHUROUS ACID PREPARATION

G. D. JENSSEN CO. INC.
WATERTOWN, NEW YORK
WESTERN REPRESENTATIVE:
A. H. LUNDBERG, 308 Orpheum Building, Seattle, Washington
FOUNDED 1915

HUBINGER **OK** BRAND

Dependable Quality for 69 years . . .

STARCH *for* **TUB SIZING**

BEATER SIZING

THE HUBINGER CO.
Keokuk, Ia. *Est. 1881*

SIZE? THICKNESS? COMPRESSIBILITY?

Get the Answers with FEDERAL GAGES

BENCH-TYPE, MODEL 57-B1
Graduated .001", range 1.000", Throat depth 2 1/16".

PORTABLE, MODEL 22P
Graduated .001", range .500", Throat depth 2".

Federal Bench-Type and Portable Gages are designed to meet the specific measuring requirements of your industry. They're built rugged to withstand day-by-day handling. Furnished, if required, with weights and anvil diameters to meet society standards. Many other types available. Write for catalog. Federal Products Corp., 1104 Eddy St., Providence 1, R. I.

FEDERAL

The Paper Industry New Literature

Books

STEEL CASTINGS HANDBOOK—1950. Edited by Charles W. Briggs. Published by Steel Founders Society of America, 920 Midland Bldg., Cleveland 15. 522 pages. $4.00

This, the fourth edition of the Handbook, is the first revision of the volume since the third edition, published in 1945. Like its predecessors, this edition is intended as a manual for those interested in the creation of improved industrial and mechanical structures of high quality.

Sketches and photos included total 440; there are 120 tables incorporating essential data said to be unavailable in any other single volume. After opening with a brief history of the steel casting industry, the new edition devotes many pages to an expanded discussion of the classes and industrial uses of steel casting design. Other sections give attention to the manufacturing processes in sections dealing with such subjects as pattern equipment, melting practice, finishing operations, and heat treating facilities and operations.

Chapters are included on such subjects as variables affecting the mechanical properties of steel castings and properties of various low alloy cast steels as related to certain composition types. Common definitions of frequently used foundry terms form another entire chapter. Chemical compositions of standard steels form the appendix of the volume, which is closely indexed.

AUSTRALIAN PULP AND PAPER INDUSTRY TECHNICAL ASSOCIATION PROCEEDINGS 1949. Volume 3. Published by Australian Pulp and Paper Industry Technical Association, P.O. Box 18, South Melbourne, Victoria, Australia. 530 pages.

This volume comprises the complete proceedings of the third annual meeting of the Association, including both discussions and papers presented. Twenty-four papers are given in their entirety, with illustrations, tables, diagrams, photos and bilbiographies of references where needed in each paper read. All such illustrative material is of generous size, with several tables of more than a page in length. A majority of the papers included concern themselves with eucalypt wood, as does the address of the Association's retiring president, H. B. Somerset.

In addition to the papers on eucalypt, typical papers presented deal with "Two-stage Countercurrent Pulping," "Sticking at the Press—Its Nature and Remedy," and "The Measurement of Internal Tearing Resistance." Transcripts of discussions which were held following the reading of each paper are included.

The volume concludes with a register of members present for this meeting, held in December, 1949.

BARRELL'S PAPER ANNUAL. Volume 9, 1950-51. Edited by William Bond Wheelwright. Published by William L. Barrell Co., Lawrence, Mass. 54 pages. Free.

Although this volume, as those preceding it in the series, is primarily a listing of all officers of industry Associations, several other features of interest to papermakers are included.

Editor Wheelwright devotes some seven pages to an interesting and informative history of the art of papermaking; included with the discussion are several reproductions of etchings, illustrating early papermaking machines. The story of the history and work of Monsanto Chemical Co. is told as the third in an annual series entitled, "Great American Research Laboratories." Eight illustrative photographs accompany this section of the book. Elsewhere, guest author Dr. Geoffrey Broughton, head of the Department of Paper Engineering at Lowell Textile Institute, describes his department's new facilities and course of study.

Booklets and Pamphlets

ONTARIO PULP & PAPER MAKERS' SAFETY ASSOCIATION, ANNUAL REPORT 1949. Published by the Association, 330 University Ave., Toronto, Ont., Canada. Remarks of Association President A. E. H. Fair at the thirty-fifth general meeting of the group, held April 5 in Toronto, form the introduction to this 14 page booklet. Following Mr. Fair's summary of Association work and achievements, a transcript of the secretary-treasurer's report is included. The remainder of the booklet is composed of 17 statistical tables of accident experiences in the member mills of the Association.

CANADIAN WOOD PULP DATA, 1950. Published by Canadian Pulp and Paper Association, 2280 Sun Life Bldg., Montreal, P.Q., Canada. This 32-page booklet, complete with illustrations, tables and diagrams, is a summary which gives factual information on Canadian wood pulp production and distribution; fundamental changes in the world supply position during the past 20 years are indicated. The booklet is divided into three sections: (1) Canada's Wood Pulp Industry, (2) The United States and the Expanding Market, and (3) World Wood Pulp Production and Trade.

PRODUCTION SERIES and MANAGEMENT SERIES. Published by American Management Association, 330 West 42nd St., New York City. Seven booklets in the production series titled "Incentive Plans for Direct and Indirect Workers," "Practical Uses of Break-even and Budget Controls," "Gearing Foremen and Workers to Production Efficiency," "Wages, Employment and Personnel Problems in a Changing Economy," "Improving the Efficiency of Plant Management," "The Union's Role in Production Management," and "The Production Department's Responsibility for Profits" range in price from 50c to $1.25; management series publication "Management Action to Reduce the Cost of Selling" is offered at 50c.

UNITED STATES DEPARTMENT OF AGRICULTURE FOREST SERVICE BULLETINS. Bulletin No. 845, "Management of Natural Slash Pine Stands in the Flatwoods of South Georgia and North Florida;" Agriculture Handbook No. 5, 25c per copy, "Pocket Guide to Alaska Trees;" and A.I.B. No. 10, 10c per copy, "Columbia River Flood Proves Value of Good Watershed Management." Published by the Forest Service, United States Department of Agriculture, Washington 25, D.C. These booklets, suitably illustrated, present material of decided interest to any reader concerned with the problems of forestry indicated by the definitive titles.

LISTING OF RESEARCH AND ENGINEERING COUNCIL PROGRAMS PERTAINING TO THE GRAPHIC ARTS. Published by Graphic Arts Research and Engineering Council, 719 Fifteenth St., N.W., Washington 5, D.C. 30 pages. $1.00 to non-members of the Council. This, the second report of the council, contains 265 descriptive listings of research projects now under way in various branches of the printing and allied industries, as compared to 156 projects reported upon in the first listing. The primary purpose of the publication is to aid in the elimination of duplication of research efforts. Among reports of especial interest to the paper industry which are included are the American Paper and Pulp Association's listing of paper research projects, several studies now under way at the Institute of Paper Industry, numerous projects at Kimberly-Clark Corp., and research being done at the Pulp and Paper Research Institute of Canada.

PROCEEDINGS OF THE LEAD HYGIENE CONFERENCE ON THE LEAD INDUSTRIES ASSOCIATION. Published by Lead Industries Association, 420 Lexington Ave., New York 17, N.Y. 137 pages, 33 illustrations. $1.00 per copy; quantity discounts available. This pamphlet contains the complete proceeding of the conference held in Chicago in November, 1948. Papers, and transcripts of such

ON THE JOB
Ready for the finest of castings.

"TAPPING A BATCH"

Every batch that goes into a Chief Sandusky Centrifugal Casting is of the same high quality. Virgin metals and composition ingot of the highest quality available are always used. Close control of melting atmospheres with accurate pyrometric control of temperature insure uniform, top grade alloys.

Specify Chief Sandusky Castings from your machine builder.

CHIEF SANDUSKY *CENTRIFUGAL CASTINGS*
SANDUSKY FOUNDRY AND MACHINE CO. SANDUSKY OHIO, U.S.A.

NINE Publications for the Papermaker

Modern Pulp and Paper Making	$7.25
Drying of Paper on the Machine	1.50
Procedure Handbook of Arc Welding Design and Practice, 9th Edition	2.00
Notes and Observations on Beaters	1.00
Lessons in Papermaking—Part 1	1.00
Lessons in Papermaking—Part 2	1.00
Trouble on the Paper Machine	.75
Pulp Bleaching (A Symposium)	.50
Technology of Papermaking Fibres	.50

Mail your order with payment to:

FRITZ PUBLICATIONS, INC.
59 E. Van Buren Street, Chicago 5, Illinois

STRAIGHT OR CYLINDER WHEEL TYPE WITH EITHER MECHANICAL OR HYDRAULIC CONTROL

HANCHETT 6K
KNIFE GRINDER

For finer, longer lasting cutting edges than you thought possible—by the most rugged machine in its range—up to 120" and longer!

Write for complete data P1-90

COVEL MFG. CO. HANCHETT

HANCHETT MANUFACTURING CO. MAIN OFFICE—BIG RAPIDS, MICH. WEST COAST—PORTLAND, ORE.

WORLD'S LARGEST MANUFACTURERS OF SAW SHARPENING AND KNIFE GRINDING MACHINERY

discussions as "The Co-ordination of Industrial Medical Services," "Urinary Porphyrins in Lead Poisoning," and "Medical Control of Lead Workers—a State Viewpoint," make up the pamphlet.

SERVICE RECORDS FOR "WOLMANIZED" PRESSURE-TREATED LUMBER, THIRD REPORT. Published by the Technical Department, American Lumber & Treating Co., 332 So. Michigan Ave., Chicago. This 44 page, illustrated report cites the case histories of more than 55,000,000 board feet of "Wolmanized"-treated lumber used in the past 25 years; 581 specific installations are described.

LOG DEFECTS IN SOUTHERN HARDWOODS. Published by the Southern Forest Experiment Station, New Orleans. Available for 25c from Superintendent of Documents, Washington, D.C. 37 pages. This booklet was written to help the recognition of defects in hardwood trees, and gives a detailed description of many kinds of tree abnormalities so that potential hardwood users may know the seriousness of each defect. Illustrations of all defects discussed are included. The booklet should prove valuable in choosing the grade log needed for a specific use.

Manufacturers' Publications

Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY *lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.*

Protective Coatings. Hercules Powder Co., Inc., Wilmington, Delaware—20-page booklet "Poly-pale Resin: Its use in protective coatings" describes its uses and manufacture. Poly-pale resin is made by treating natural rosin to cause a portion of the unsaturated rosin acids present to unite as polymers. This polymerization increases the softening point and viscosity of the resin, while unsaturation is lowered and oxidation tendencies are decreased. It can be used in esters, maleic-modified and phenolic-modified resins, and varnishes, metal resinates, gloss oils, tung oil varnishes, and tung oil limed rosin varnishes. Illustrated with charts.

Pneumatic Conveying Systems. Convair Corp., Pittsburgh, Pa.—12-page bulletin 103 describes the Convair conveying system, and gives examples of its application to many different types of material and industries. Since Convair conveyers are applicable for materials ranging in size from 800 mesh to 8 inches in size, with weight up to 350 lb. per cu. ft., possibilities for their use are numerous.

Exhibiting and Controlling Instruments. Fischer & Porter Co., 50 County Line Road, Hatsboro, Pa. 28-page Catalogue 50 describes new developments in exhibiting and controlling flow instruments; basic devices manufactured by this firm for coupling a primary metering element to a secondary or exhibiting instrument, such as a flow indicator, recorder, integrator or pneumatic controller unit; and the "Magnabond" clutch. Diagrams, photos and charts are incluuded, as is a bibliography of other catalogues available from this manufacturer concerning subjects in this field.

Rubber-lined Centrifugal Pump. Allis-Chalmers Mfg. Co., 991 S. 70th St., Milwaukee, Wis.—16-page bulletin entitled "SRL Rubber-Lined Pumps" describes these new pumps that are designed for handling liquids with solids of 325 mesh to ¼-in. diameter. The pump has a vulcanized rubber lining of controlled density to provide maximum wear resistance. It is available in open and closed non-choke impeller types of four sizes each. Another type is a vertical sump pump with motor mounted on stool above the sump floor plate either direct or Texrope driven. Illustrated with tables, diagrams, and photographs.

Glycerine Uses. Glycerine Informaion Service, Dept. PR, 295 Madison Ave., New York 17, N.Y.—12-page booklet entitled "Why Glycerine?" is a general survey of all glycerine uses, other than those in the fields of foods, drugs and cosmetics, alkyd resins and ester gums, and textiles, which are handled in four other booklets of this series. Glycerine has four major properties—as a humectant, a solvent, a sweetener, and an antiseptic—and these uses touch nearly every industry. Included are tables to specific gravity, viscosity, freezing point of aqueous glycerine solutions, and bibliography of references.

Water Clarification and Softening. Graver Water Conditioning Co., Dept. 146, 216 West 14th St., New York 11, N. Y.—12-page bulletin WC103 describes new water clarifiers and cold process softeners. Principles and chemistry of cold process water treatment are explained concisely. The bulletin also gives various accessories, along with explanations in tabular form for the design, operation and features of the new Graver Reactivator. Illustrated with diagrams and installation photographs.

Elevated Water Tank. Chicago Bridge & Iron Co., 2445 McCormick Bldg., Chicago 4, Ill.—"The Watersphere", an 8-page pamphlet, describes this new elevated water tank that provides gravity water pressure for general service and fire protection. The watersphere is built entirely of steel plates that are butt-welded throughout. The tank is supported by a single cylindrical column, the flared base of which rests on and is anchored to a circular concrete foundation. The pamphlet contains illustrations of typical installations from 25,000 to 150,000 gallons capacity.

Coating Paper. Philadelphia Quartz Co., Public Ledger Building, Philadelphia 6, Pa.—Bulletin 15-1 describes the processes of coating paper with sodium silicate. It is pointed out that silicate, as a mineral composition, is odorless, non-corrosive, non-poisonous, extremely grease-resistant and unattractive to vermin. The silicate coated paperboard is primarily used for food containing fats and oils. The booklet reviews how to apply the coating, dilution, and the type of silicate to use. Illustrated.

Solder Checking Instrument. Wheelco Instruments Co., Chicago 7, Ill.—2-page Bulletin TI-1 describes the portable tin content indicator for solder which provides a means of determining the ratio of lead and tin. Photograph of the unit is shown.

Pulp Refiners. The Bauer Brothers Co., 1759 Sheridan Ave., Springfield, Ohio. Bulletin P-1 on this subject gives descriptions of modified designs for special services, and also auxiliary and supplementary equipment. Text fully explains structural and operational features of the 400 series pulp refiners. Illustrated with tables, diagrams and photographs.

Flexible Tubing. Flexible Tubing Corp., Branford, Conn.—Bulletin No. 5-4 tells of this newly improved type of lightweight, flexible tubing, which will find many uses in industry. It is wear and heat resistant, portable, retractable, and easy to assemble. Resistant to rupture or collapse under pressure or vacuum, this new tubing is available in a variety of standard plys and materials, as well as specially engineered combinations. Illustrated.

Piping and Tubing. Michigan Pipe Co., Bay City, Mich.—24-page booklet is a combination of three bulletins giving specifications and applications of this company's wood stave pipe and wood lined pipe, also metal tubing. Engineering Bulletin 325-140 is devoted exclusively to the subject of Friction Losses in Pulp and Paper Stock Lines using Michigan Wood Lined Pipe. There is a pipe specification table for stock consistencies 1% to 10%. Another of the three bulletins, No. 0-050, devotes considerable space to applications for chemical processing, including paper, pulp, and allied products. All of the bulletins include pertinent data and illustrations.

Pigments. Titanium Pigment Corp., 111 Broadway, New York 6, N. Y.—64 page booklet entitled "Titanox Pigments—Properties and Uses" gives expanded information on titanium dioxide pigments. Included are descriptions of new products and new applications, with charts and illustrations. The best application of a pigment is usually suggested by its properties, so the discussion of uses is brief. There is a section devoted to the use of Titanox pigments in the paper industry. It shows where and how Titanox pigments can be used to the greatest satisfaction of the user, such as wrappings, book covers and bindings, and magazines. Profusely illustrated with photographs and diagrams.

Crane Blocks. American Hoist & Derrick Co., St. Paul 1, Minn.—Catalogue No. 300-16 describes the new Lo-Head crane blocks. These new blocks mean more production in that their short over-all length increases control of hook and allows higher lifts for any fixed radius. They have sealed antifriction bearings that require lubrication only once each 2000 hours. Illustrated with charts and photographs.

Hand Hoists. Wright Hoist Div., American Chain & Cable Co., Inc., York, Pa.—6-page folder No. DH-164 describes the Wright safeway hand hoists. Included are specifications, action photographs, cross sectional view of the hoist, and graphic illustrations of the unit and a listing of its features.

Resin Coatings. General Mills Research Laboratories, 2010 E. Hennepin Ave., Minneapolis 13, Minn.—8-page data sheet describes properties and suggested applications for Polyamid resin suspensoids, claimed to be outstanding as heat-sealable coatings for paper, metal foils, plastic films, cloth and leather.

Dry and Wet Thickness Gages. Henry A. Gardner Laboratory, Inc., 4723 Elm St., Bethesda, Md.—4-page leaflet describes and illustrates the Interchemical dry thickness gage for measuring foils or unattached sheet materials. 6-page, three-way folder describes and illustrates the Interchemical direct reading wet film thickness gage for measuring the wet film thickness of paint, varnish, lacquers and related products. Prices included.

Welding Fittings Price List. Cooper Alloy Foundry Co., Hillside 5, N. J.—Price list 52-W contains prices of stainless steel welding fittings that cover a wide variety such as elbows, return bends, stub ends, tees, etc., in types 304, 316, and 347 stainless steel.

Fan Ventilator. The Swartwout Co., 18511 Euclid Ave., Cleveland, Ohio—4 page bulletin 341 describes the new Airlift, a centrifugal fan roof ventilator, that can be used for efficient duct exhaust against static pressure. Its 14 sizes, providing nearly 50 capacity variations, are listed as well as illustrations and drawings.

Air Conditioning System. Anemostat Corp., 10 E. 39th St., New York, N. Y.—A new chart illustrates with photographs and diagrams the principles of checking the operation of an air conditioning system. It is for use principally in conjunction with the Anemotherm Air Meter, which was introduced some time ago by this company. It gives instructions on how to apply this new instrument in checking up on air heating and cooling system operation.

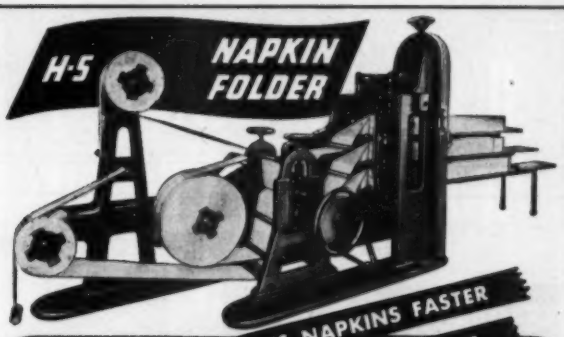
Government Procurement. Trilane Associates, Inc., 1 Hudson St., New York 13, N. Y. —16 page brochure is designed to aid manufacturers in obtaining Government business and is filled with accurate, up-to-date infor-

Better Coverage

COATING & LAMINATING

No. GL-2, illustrated, is an all-purpose, heavy duty machine that is adaptable to any type laminates required. The open design construction permits easy installation of varied applicators for pastes, glues, waxes or asphalts. Assemblies may be rearranged, new ones added or subtracted, according to sheet leads required. Write for complete detailed information.

HUDSON-SHARP
MACHINE CO • GREEN BAY • WIS



H-5 NAPKIN FOLDER

PRODUCES NAPKINS FASTER . . . THAN EVER BEFORE

MORE and better napkins with our post-war No. 2-A folder. Makes all folds — quarter fold, eighth fold, sixteenth fold and dispenser fold — on one machine. This unusual versatility, plus our usual quality, makes this multiple duty folder an important addition to your production department. Write for information.

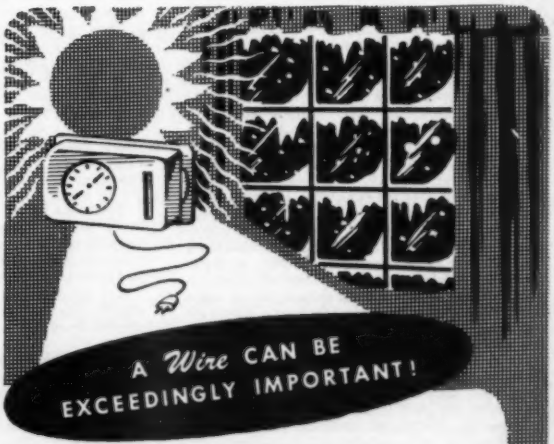
HUDSON-SHARP
MACHINE CO • GREEN BAY • WIS

Tops in Value

Here is America's top value in a Well Water System—value that comes from years and years of careful study, much experiment and the final solving of just what metals are best for each part of the pumping equipment. This is the Water System that has made good in all parts of the world and under all kinds of conditions. This is the kind of a system that will give you the utmost satisfaction. Write for catalogs.

LAYNE & BOWLER, Inc.
General Offices, Memphis 8, Tenn.

LAYNE
WELL WATER SYSTEMS
VERTICAL TURBINE PUMPS



A *Wire* CAN BE EXCEEDINGLY IMPORTANT!

A simply plugged-in wire from a modern thermostat makes possible a virtually perfect regulation of heat and cold. This automatic control contributes much to the effortless comfort which is the present-day aim of American householders. Likewise, thorough-going, care with reference to every strand of wire is indispensable to the manufacture of quality Fourdrinier wire cloth.

THE LINDSAY WIRE WEAVING COMPANY
14001-14299 ASPINWALL AVENUE • CLEVELAND 10, OHIO

Lindsay **WIRES**
FOR PAPER MILLS

SPONSORED INDUSTRIAL RESEARCH

BJORKSTEN RESEARCH LABORATORIES

CHICAGO, ILL. 13791 S. AVE. "O"
MADISON, WIS. 323 W. GORHAM ST.
NEW YORK, N. Y. 50 E. 41ST ST.

C. M. GUEST & SONS

Builders

GREENSBORO, N. C.
ANDERSON, S. C.

Paper & Pulp Mills *Waste Disposal*
Water Filtration *Steam Power Plants*
Process Piping *Textile Mills*

SERVING THE INDUSTRIAL SOUTH for MORE THAN FIFTY YEARS

W. B. COHAN

Consulting Engineers

624 S. MICHIGAN AVE.
CHICAGO 5, ILLINOIS

Structural, Mechanical and Electrical Design for the Construction and Maintenance of

PAPER AND PULP MILLS
PROCESSES PIPING PLANT LAYOUT

ARTHUR C. DRESHFIELD, Ch.E.

CONSULTANT

Research . . . Development . . . Control
Market Research

Laboratory investigations thru affiliation with
Chicago Testing Laboratory
536 Lake Shore Drive, Chicago 11, Illinois

FREDERICK WIERK, P.E.

CONSULTING ENGINEER

220 E. 42nd Street — New York 17, N. Y.
Reports and Designs for Construction or Modernization of Pulp & Paper Mills, Steam and Hydro Power. Stream Pollution Abatement.

mation relative to Government purchasing. It is divided into a number of sections, each dealing with a different aspect of procurement.

Control Devices. Minneapolis-Honeywell Regulator Co., 4489 Wayne Ave., Philadelphia 44, Pa.—64-page booklet entitled "Industrial Control Devices" presents over 100 different models of non-indicating electric, electronic, and pneumatic controllers. Many important additions to previous lines are shown such as electronic temperature controllers, self-contained electric temperature controllers, and pneumatic insertion type temperature controllers. Illustrated with photographs.

Oil Seals. Johns-Manville Corp., 22 East 40th St., New York 16, N. Y.—16-page handbook entitled "Johns-Manville Clipper Seal" contains useful data for anyone desiring information on oil seals. It is divided into sections on the principle of Clipper Seals, their construction, advantages in various applications, installation data, and other information. Photographs show where to use these seals and how to install them. Drawings illustrate how the lip and heel construction of these seals can be varied.

Automatic Clutches. Automatic Steel Products, Inc., Canton, Ohio—A complete line of automatic clutches is described and illustrated in three new bulletins. Bulletin 216, 8 pages, describes the Mercury Clutch in general, listing and illustrating various applications from air conditioning to washing machines. Bulletin 217, 4 pages, deals with Mercury Automatic Clutches applied to gasoline engines, and Bulletin 218, also 4 pages, covers electric motor installations.

Boiler Tubes. The Babcock & Wilcox Tube Co., Beaver Falls, Pa.—Bulletin No. TB-231 contains technical data on electric-resistance-welded steel boiler tubes. Includes tables on maximum allowable working pressures, and determination of weight in pounds per lineal foot of steel tubes in various minimum wall sizes.

Materials Handling. Towmotor Corp., 1226 E. 152nd St., Cleveland 10, Ohio—8-page Certified Job Study No. 94 tells in detail how a complete fleet of Towmotor equipment aided in increased production at the Philadelphia Piers, Inc., warehouse. Illustrated in the study is the handling of tons of canned goods, 2100-lb. loads of bagged commodities, wood pulp bales at the rate of 18 tons per man-hour, cumbersome 5 x 12-ft. steel sheets, and 3000-lb. loads of tallow. Illustrated.

Pumps. Eastern Industries, Inc., New Haven, Conn.—Two new bulletins, No. 100 and No. 200, describes centrifugal pumps and positive pressure pumps. Bulletin No. 100 describes over 100 close-coupled centrifugal pumps, that are available to pump from 0 to 70 psi, 0 to 70 gpm. These pumps are also available in special metals. Bulletin No. 200 contains information of positive pressure vane and gear pumps that are close-coupled and move non-lubricating liquids at high pressures—vane pumps to 60 psi, and gear pumps to 200 psi. Illustrated with photographs, drawings and charts.

Stainless Steel. Armco Steel Corp., Middletown, Ohio—12-page booklet presents a discussion of the properties of stainless steel and outlines the proper grades to use for parts subjected to heat. There is also a section devoted to detailed descriptions of the various chromium-nickel and chromium stainless grades used for heat resistance. Graphs illustrate the relative scaling resistance, high temperature tensile strength, creep strength, and high temperature rupture strength of the various stainless steel grades.

Vinyl Insulation. Insul-Mastic Corporation of America, Oliver Building, Pittsburgh 22, Pa.—Bulletin G-103 describes methods of using Vinyl System for insulation purposes. Through photographs, it is shown how to apply the coating and where it is used in industry. It is brought out that this coating is economical to use, and may be removed easily for repairs to the object coated. This same coating is used by the armed forces to seal up and protect ships and planes.

Water. Hall Laboratories, Inc., Hagan Building, Pittsburgh 30, Pa.—4-page booklet tells of the industrial water engineering services offered in the fields of water procurement, treatment, usage and disposal. Typical service problems are discussed, with illustrations showing flow schemes of water in process and disposal.

Stainless Steel Valves. Cooper Alloy Foundry Co., Hillside, N.J.—48-page booklet contains engineering drawings, weights, dimensions, size ranges, materials, corrosion data, nomenclature and design information on the new line of stainless steel valves. Illustrated with charts and drawings.

Feeder and Conveyor. Robins Conveyors Division, Hewitt-Robins, Inc., 270 Passaic Ave., Passaic, N. J.—Two new bulletins describe new equipment for use in many different industries. Bulletin No. 134 describes the Vibra-Feeder, which employs mechanical rather than electro-magnetic means of operation. Bulletin No. 135 tells of the Vibra-Veyor, which produces balanced mechanical operation without counterweights. Both are well illustrated.

Cleaning Unit. Shartle Bros. Machine Co., Middletown, Ohio.—4-page bulletin 11-SB describes the Hydraclone, a new machine which removes staples, pins, wire, grit, glass, rubber, plastic, asphalt, etc., from paper stock. Data charts show the results of runs on 100 tons each of waste containers and dirty mixed papers as furnished. Illustrated.

Solenoid Valves. The Johnson Corporation, Three Rivers, Mich.—8 page catalogue describes a new line of direct operated solenoid valves. It lists sizes from ⅛ inch to 3 inches; valves for normally open or normally closed service; stainless steel disc seats; valves with special dash-pot construction to stop water hammer, and many other features of these new valves. Illustrated with photographs and diagrams.

Calenders. Farrel-Birmingham Co., Inc., Ansonia, Conn.—12 page booklet illustrates paper-machine and board calenders in a wide range of sizes, including the largest machine for calendering paper-board which has yet been built. Illustrated.

Steam Jet Syphons. Schutte & Koerting Co., Dept. JC, 12th & Thompson Sts., Philadelphia 22, Pa.—24 page catalogue describes the new line of Steam Jet Syphons which operate on the jet principle utilizing the energy of steam under pressure to pump, heat, mix liquid sand handle solids. Illustrated.

Research Microscopes. Bausch & Lomb Optical Co., Rochester 2, N. Y.—20-page catalogue D-1010 describes the new series E, an addition to the series CC and DDE of research microscopes. Tables and photographs show the workings of these new instruments. Included in the booklet is a list giving prices of microscopes and accessories. Illustrated.

Federated first for Lead Products

Asarco Sheet Lead ... All commercial weights and sizes. Chemical ... Tellurium Chemical ... Antimonial.

Asarco Lead Pipe ... All commercial sizes. Special sizes on request. Chemical ... Tellurium Chemical ... Antimonial.

Asarco Lead and Lead Lined Valves ... Split Type "Y" and "Angle", Standard "Y", Gate, Check, Hard Lead "Y", Plug and Seat.

Asarco Lead Fittings ... Elbows, Crosses, Tees, "Y's", (with plain ends, with flanges on, or for flanging in the field). Chemical and Antimonial.

Asarco Lead Wool ... 5/8" rope in 50 lb. waterproof bags.

Asarco Lead Specialties ... Extrusions and Castings to specification.

See Federated also for Lead Lined Pipe Lead Lined Fittings, Lead Lined Flanges

Federated Metals Division
AMERICAN SMELTING AND REFINING COMPANY, 120 BROADWAY, NEW YORK 5, N. Y.

Founded 1901 in the new empire field

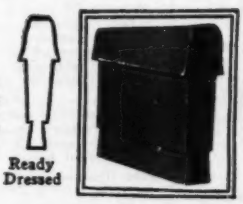
ORISKANY WATERBURY FELTS

MADE BY

H. WATERBURY & SONS CO.
ORISKANY, N. Y.

"READY DRESSED" **MILL COGS**
LABOR SAVING — TIME SAVING

The Most Economical Filling That Can Be Put in a Mortise Wheel.



Ready Dressed

Blank Head

We Make Any Style or Size Wanted.

Write for Instruction Sheet "O" Which Is Free.

QUICK SERVICE ON ALL SIZES

THE N. P. BOWSHER CO., South Bend, Ind.

PAPERS COATED BETTER, EASIER -at Less Cost

... with these Glidden SOYA PROTEIN ADHESIVES

ALPHA* PROTEIN

Here are just a few of the many advantages of Glidden's pure isolated Alpha* Protein which make for better, easier and lower cost coating of paper:

- Alpha* Protein solution is stable over a wide temperature range.
- Alpha* Protein is compatible with the various pigments used and binds them to the fiber of the raw stock easily.
- Alpha* Protein adhesive has a color which does not affect, to any extent, the colors of the pigments used or their hiding power.
- Alpha* Protein alkaline-cut adhesive permits addition of formaldehyde to coating colors to make the finished paper water resistant.
- Alpha* Protein adhesive is free-flowing at a low water ratio.
- Alpha* Protein adhesive keeps pigments or other insolubles more uniformly suspended—prevents formation of hard, difficult-to-disperse masses.
- Alpha* Protein adhesive sets quite rapidly and dries easily without undue shrinkage or interference with the finish when the paper is calendered.

PROSEIN*

A mechanically refined soya protein adhesive, Prosein* is preferred for reasons of economy in cases where certain outstanding qualities exclusive to Alpha* Protein are not required. Compatible with Alpha* Protein and other alkaline-cut protein adhesives in all proportions. An efficient adhesive for many uses.

The Glidden Company
SOYA PRODUCTS DIVISION
5165 West Moffat Street • Chicago 39, Illinois

QUALITY Glidden PRODUCTS

*Trade Mark Registered

GARLOCK 7021
Compressed Asbestos Sheet Packing

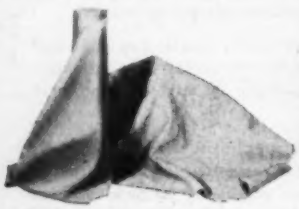
Superior Performance

Top performance is the result of ability, experience and extra effort. GARLOCK Sheet Packings are superior gasketing materials because of careful selection of raw materials, experienced workmanship and constant quality control.

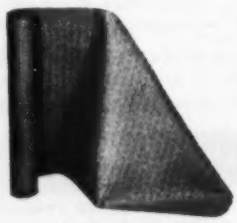
GARLOCK 7021 Compressed Asbestos Sheet is exceptionally strong and tough. Gives superior service against gasoline, oil, gas or steam at high temperatures and extreme pressures.

GARLOCK 22 Red Rubber Sheet Packing is tough and resilient. Specially recommended for hot or cold water and low pressure steam joints.

GARLOCK 660 Cork-Fibre Sheet Packing combines granulated cork and vegetable fibre into a strong compressible sheet; treated with an oil resistant binder. An ideal gasketing material for oils and solvents at temperatures up to 212°F.



GARLOCK 22
Red Rubber Sheet Packing



GARLOCK 660
Cork-Fibre Sheet Packing

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK

In Canada: The Garlock Packing Company of Canada Ltd., Montreal, Que.

GARLOCK
SHEET PACKINGS

MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

Quotations to consuming mills, cents per pound or dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Blue Overalls	9.00 to 9.50
Corduroy, Men's	4.50 to 4.75
Corduroy, Ladies'	4.50 to 4.75
Washables, No. 1	4.75 to 5.00
Percales	7.75 to 8.00
Light Prints, No. 1	7.25 to 7.50
Khaki Cuttings—	
Bleachable	5.75 to 6.00
Unbleachable	5.25 to 5.50
New White Canvas	13.00 to 13.50
Canton Flannels, Bleached	12.50 to 13.00
Canton Flannels, unbleached	12.00 to 12.50
Shirt Cuttings—	
New White No. 1	14.00 to 14.50
White Shrunk	13.00 to 13.50
Silesias No. 1	9.25 to 9.50
New Unbleached	14.00 to 14.50
Fancy	6.50 to 6.75
Linen Cuttings—	
American	9.25 to 9.50
White	15.50 to 16.50
Grey	15.00 to 16.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Roofing—	
No. 1	1.60 to 1.70
No. 2	1.50 to 1.60
No. 3 and 4	1.30 to 1.40
Twos and Blues—	
Repacked	2.50 to 2.75
Thirds and Blues—	
Repacked	2.25 to 2.50
Miscellaneous	1.75 to 2.00
Whites, No. 1—	
Repacked	4.50 to 4.75
Miscellaneous	3.00 to 3.25
White, No. 2—	
Repacked	3.25 to 3.50
Miscellaneous	2.50 to 2.75

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	5.25 to 5.50
Domestic	5.75 to 6.00
Wool Tares—	
Light	5.50 to 5.75
Heavy	6.00 to 6.25
No. 1 Scrap Bagging	5.00 to 5.25
Manila Rope—	
No. 1 large	5.50 to 5.75
No. 1 small	4.50 to 4.75
Sisal Rope—	
No. 1 large	5.00 to 5.25
No. 1 small	4.50 to 4.75
New Burlap Cuttings	6.50 to 7.00
Jute Threads—	
Foreign (Nom.)	6.50 to 7.00
Domestic	6.00 to 6.50
Strings—	
No. 1 sisal	4.50 to 4.75
No. 2 sisal	4.00 to 4.25
Soft jute	4.25 to 4.50
Mixed	2.50 to 2.75

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

Shavings—	per ton
Hard White Env. Cuts	150.00 to 165.00
Hard White, No. 1	110.00 to 120.00
Soft White No. 1	100.00 to 105.00
Soft White, one-cut	110.00 to 120.00
Soft White, Misc.	80.00 to 85.00
Fly Leaf, No. 1	35.00 to 40.00
Fly Leaf, Woody No. 1	27.50 to 30.00
No. 2 Mixed Col. Woody	22.50 to 25.00
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	28.00 to 30.00
Mixed Books	18.00 to 20.00
Ledger Stock—	
No. 1 White	65.00 to 70.00
No. 1 Mixed (Colored)	50.00 to 55.00
Manilas—	
New Env. Cuttings	70.00 to 75.00
New Env. Cuts, One-Cut	—
Extra Manilas	40.00 to 45.00
Manila Tab Cards, Free of Ground Wood	90.00 to 95.00
Colored Manila Tab Cards	50.00 to 55.00
Kraft—	
New Envelope Cuttings	90.00 to 95.00
Trimmed Sorted No. 1 100%	55.00 to 60.00
No. 1 Old Assorted	40.00 to 45.00
News—	
White Blank	70.00 to 75.00
Overissue	27.00 to 29.00
No. 1 Folded	24.00 to 25.00
Old Corrugated Containers	34.00 to 36.00
New Jute Corrugated Cuts	33.00 to 35.00
Mill Wrappers	20.00 to 21.00
Box Board Chips	17.00 to 18.00
No. 1 Mixed Paper	17.00 to 18.00

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.05—
Ground, cwt.	3.80—
Powdered, cwt.	4.20—
Blanc Fixe—	
Pulp, bulk, ton	80.00—
Dry, barrels	85.00—
Bleaching Powder—	
Drums, cwt.	4.50 to 5.00
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	39.00 to 40.00
Argentine, lb.	35.00 to 36.00
China Clay—	
Domestic Filler	
Bulk (mine) ton	10.00 to 15.00
Domestic Coating	
Bulk (mine) ton	15.00 to 25.00
Imported (ship side)	
Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tank cars (wks) cwt.	2.80 to 3.05
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	.29¼ to .29¾
Litharge, powd. bbl. lb.	.14¾ to .15¾
Rosin (Gum)—	New York, per 100 lbs.
E	7.20—
F	7.30—
G	7.20—
WW	7.55—
Rosin (Wood), carlots, F.O.B. South	5.00—

MARKET QUOTATIONS

Salt Cake—
Dom. bulk (wks) ton..... 22.00 to 24.00
Imp. bulks on dock—
(Atl. ports) ton (Nom.) 25.00—

Soda Ash—
Bulk (works), cwt..... 1.10 to 1.25
Paper Bags, cwt..... 1.35 to 1.50

Soda (Caustic)—
Solid drums, cwt..... 3.20 to 3.25
Ground and flake, drums, cwt. ..... 3.60 to 3.65

Sodium Silicate—
60 deg. 55 gal. drums, (works) cwt..... 1.35 to 1.45
40 deg. 35 gal. drums, (works), cwt. ..... 1.05 to 1.20

Starch—
Pearl, 140 lb. bags, cwt....5.42—
Pearl, barrels, cwt..... 5.42—
Paper, (Sp.) bags, cwt..... 5.42—
Powdered, barrels, cwt..... 5.53—

Sulphur (Crude)
(Mine) bulk, long ton..... 18.00—

Talc—
Dom. 100 lb. bags (mine) ton ..... 23.00 to 28.00
Canadian ..... 35.00 to 45.00

Titanium Dioxide—
Barium Pig, bbls., lb..... .19½ to .21½
Calcium Pig. bbls., lb..... .19½ to .21½

Zinc Sulphide, bbls., lb. ..... 11.50 to 11.75

WOOD PULP

Prices, dollars per short, air dry, ton, with inland freight allowed, are:

Bleached sulphite, Swed..... 128.00—
Bleached, sulphite, Finish.. 126.00—
Bleached sulphite, dom.....122.00 to 125.00
Easy bleaching sulphite.... —
Unbleached kraft, Finn..... —
Unbleached sulphite, Swed. 107.00—
Unbleached sulphite, Fin... —
Unbleached sulphite, dom. 107.00—
Unbleached kraft,Swedish.. 96.50—
Unbleached kraft, northern 95.00 to 105.00
Unbleached kraft, southern 95.00 to 97.50
Bleached sulphate, Swedish 136.00—
Bleached soda, domestic.. 120.00 to 122.00
Sulphite screenings, dom. 40.00 to 50.00
Sulphite screenings, dom. 40.00 to 50.00
Groundwood, domestic and Canadian ..... 70.00 to 72.50

PAPER

f.o.b. New York City

Boards—	per ton
Binders	100.00—
Chip	90.00—
Chip, tube and can	95.00—
Chip, full blending	97.50—
Chip, sgl. mla. lined	105.00—
Coated, white patent .016	137.50—
.020 and heavier	127.50—
Kraft liner	105.00—
Filled News	92.50—
Container	105.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

(Per cwt. in ton lots)
Uncoated (Untrimmed)

Book White (M. F.)—	
A Grade E. F.	16.15—
B Grade E.F.	15.40—
A Grade S. C.	16.65—
B Grade S. C.	16.15—
No. 2 Uncoated Offset 4 sides, White	—
Machine Coated White	
No. 1 Glossy	21.65—
No. 2 Glossy	20.40—
No. 3 Glossy	19.65—
No. 4 Glossy	—
No. 2 Offset	16.90—
C1S Litho (Varnish)	—
C1S Litho (Non-Varnish)	—

Writing Papers—f.o.b. mill with zone, quantity, packing and other differentials allowed:

Rag Content Bond—
(In Ton Lots)

	per cwt.
Extra 100% Rag	57.55—
100% Rag	50.65—
75% Rag	39.20—
50% Rag	32.55—
25% Rag	27.70—

Rag Content Ledger—
(In Ton Lots)

	per cwt.
Extra 100% Rag	60.15—
100% Rag	51.90—
75% Rag	40.45—
50% Rag	32.35—
25% Rag	29.10—

Sulphite Bond—

	per cwt.
Air dry, watermarked	—
No. 1 watermarked	18.20—
No. 2 watermarked	17.25—
No. 4 watermarked	16.25—

Sulphite Ledger—

	per cwt.
No. 1 watermarked	19.50—
No. 2 watermarked	18.70—
No. 4 watermarked	18.15—

Glassine (f.o.b. mill)—

	per cwt.
Embossed (25 lb. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof—	
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—

News—

	per ton
Rolls, Standard Contract)	100.00 to 103.00
Rolls (Spot)	(Nominal)
Sheets	119.00—

Tissues (Carlots)—

	per ream
White No. 1	1.55—
White No. 2	1.20—
Bleached Anti-Tarnish	—
Colored	—
Anti-Tarnish Kraft	1.37½—
Manila	1.60—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.90—
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.90—
Toilet, Bleached (M. shts.) per cs.	7.10—
Toilet, Unbleached (M. shts.) per cs.	5.85—

Towels—

	per case
Bleached	5.25—
Unbleached	4.50—

Wrappings (Kraft)—

	per cwt.
Super-Standard	8.25 to 8.75
No. 1 Wrapping	7.50 to 8.00
Standard Wrapping	6.75 to 7.25
Standard Bag	6.50 to 6.75
Variety Bag	—

Wrappings (Sulphite and Bleached Kraft)—
(Rolls, f.o.b. mill)

Bleached Papers—

	per cwt.
M.F. & M.G. Waxing, 30 lb. (Carloads only)	—
(10,000 lb.)	—
Drug wrapp., 35 lb.	—

Unbleached Papers—

Com. Gr. Butch. 40 lb.	—
No. 1 Butchers	—
No. 1 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
No. 2 Imit. Parch. & Dry Fin. Groc. Sulphite, 30 lb.	—
Steam Finish, 50 lb.	—
Water Finish, 50 lb.	—

Manilas—

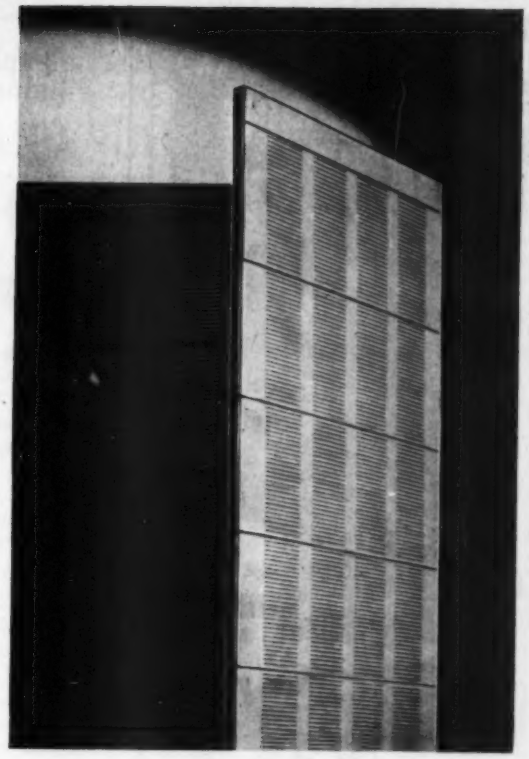
Envp. Mla., Sub. 16-40 (No. 1)	—
Envp. Mla., Sub. 16-28 (No. 2)	—
Envp. Mla. (Prices based on large sheets untrim'd ream marked, in bdls.)	—

Wrapp Mla. 35 lb. up—

No. 1	8.75—
No. 2	—

M.G. Sulphite and Kraft (other than Waxing)

Grade B20 lb.	—
Grade A-22 lb.	—



3 Good Reasons Why
28,000 FABRICATED SCREEN PLATES
Are Now In Service

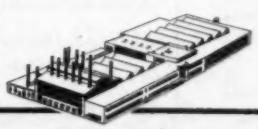
"Hardy" fabricated screen plates, made by Magnus, have a high-strength, thin-sheet design — specially engineered for maximum flow. That's why you're sure of these 3 service-proved advantages:

(1) Increased Plate Capacity — The thin sheet eliminates relief milling, and with recommended arrangement, substantially increases capacity per plate.

(2) Longer Life — Slots remain sharp, side walls highly polished for the life of the plate. There's greatly improved corrosion resistance.

(3) High, Sustained Yield — You get consistent, uniform quantities of cleaner pulp.

It all adds up to improved performance at reduced operating costs. Complete information is yours on request. Or if you like, we'll gladly have an engineer call.



MAGNUS METAL CORPORATION
FITCHBURG, MASSACHUSETTS
Metalworkers for the Paper Trade
SCREEN PLATES: BRONZE, CHROME-NICKEL-STEEL, AND INCONEL
VALVES: GATE, SWING CHECK, BLOW, GLOBE, ANGLE AND "Y"

FLASH DRY SAMPLES TO DETERMINE *Moisture*

FOR ALL TYPES OF SAMPLES

FIBROUS · GRANULAR

LIQUID · CRYSTALLINE

Samples of your materials can be dried and tested for moisture content in a matter of a *few minutes.* You will save valuable processing time, reduce rejections, and improve product quality, when you install a DIETERT-DETROIT MOISTURE TELLER.

The moisture test is made in exact moisture percentage and test results will check exactly with the standard oven test. No corrections or calibrations are necessary.

Write TODAY TO DEPT. M-1 FOR DETAILS

CONTROL EQUIPMENT

HARRY W. DIETERT COMPANY

9330 ROSELAWN · DETROIT 4, MICH.

The Paper Industry Index to Advertisers

When writing them, please mention The Paper Industry.
Refer to the Paper and Pulp Mill Catalogue and Engineering Handbook at your mill office, for complete listing of all advertisers' products.

American Brass Company....571
American Hoist & Derrick Co.....
Anaconda Copper Mining Company....571
Anheuser-Busch, Inc....574
Anthracite Equipment Corporation.....
Appleton Machine Company, The....655
Appleton Wire Works, Inc....644
Appleton Woolen Mills....554
Armstrong Machine Works.....
Arnold, Hoffman & Co., Inc.....
Asten-Hill Mfg. Co.....
Atkins and Company, E. C....656
Aurora Pump Company....640

Bagley & Sewall Co., The....601, 638
Bailey Meter Company....678
Baker & Adamson Products, General Chemical Div., Allied Chemical & Dye Corp....559
Bauer Bros. Co., The....599
Becco Sales Corporation.....
Beloit Iron Works.....
Bird Machine Company.....
Birmingham Tank Company.....
Black-Clawson Co., The....573
Boston Woven Hose & Rubber Co.....
Bowser, Incorporated.....
Bowsher Co., The N. P....673
Buffalo Forge Company.....
Buffalo Pumps, Incorporated.....
Bulkley, Dunton Pulp Co., Inc.....

Cady and Company, E. J.....
Cameron Machine Co....631
Carthage Machine Co.....
Chain Belt Company....637
Chicago Bridge & Iron Company....555
Clark Equipment Company, Industrial Truck Division....633
Classified Advertising....665
Coes Company, Loring.....
Continental Foundry & Machine Co.....
Curlator Corporation....551

Dempster Brothers, Inc....560
DeZurik Shower Company....663
Dicalite Div., Great Lakes Carbon Corp.....
Dietert Co., Harry W....676
Dilts Machine Works....573
Downingtown Mfg. Co....562
Draper Brothers Company....652
du Pont de Nemours & Co., E. I....561

Eastwood-Nealley Corporation....650
English China Clays Sales Corp....658

Fawick Airflex Company, Inc....582
Federal Products Corporation....667
Federated Metals Division, American Smelting and Refining Company....673
Fitchburg Screen Plate Co., Inc....663
Fleishel Lumber Company.....
Foxboro Company, The....572
Fritz Publications, Inc....669, 677

Garlock Packing Co., The....674
General Chemical Division, Allied Chemical & Dye Corporation....559
Glidden Company, The....673
Goulds Pumps, Inc....602
Green Bay Foundry & Machine Works....658

Hanchett Manufacturing Co....669
Harrington & King Perforating Co.....665
Harris-Seybold Company.....
Hercules Powder Company....565
Hills-McCanna Company....586
Hooper & Sons Co., Wm. E....558
Hubinger Company, The....667
Hudson-Sharp Machine Company....671
Hunt Machine Co., Rodney.....
Huyck & Sons, F. C....597

Infilco, Incorporated.....
Ingalls Iron Works Company.....
Insul-Mastic Corporation of America....577

Jeffrey Mfg. Co., The.....
Jenkins Bros.....
Jenssen Company, Inc., G. D....667
Johnson Corporation, The.....
Jones Foundry Machine Co., W. A.....

Kalamazoo Tank & Silo Co....663
Kelco Company....643
Koppers Company, Inc.....
Kuhns Brothers Company, The.....

Langston Co., Samuel M....3rd Cover
Layne & Bowler, Inc....671
Lewellen Manufacturing Co....659
Lindsay Wire Weaving Co., The....671
Link-Belt Company....580
Lockport Felt Company....641
Lodding Engineering Corp....639
Lunkenheimer Co., The....4th Cover

Magnus Metal Corporation....675
Mathieson Chemical Corporation....552
Michigan Steel Casting Co....661
Midwest Piping & Supply Co., Inc....563
Minneapolis-Honeywell Regulator Company, (Industrial Division)....557
Mixing Equipment Co., Inc.....
Modern Engraving & Machine Company.....
Morden Machines Company.....
Morningstar, Nicol, Inc....570
Mt. Vernon-Woodberry Mills, Inc.....
Murray Mfg. Co., D. J....576

Nash Engineering Co., The....661
National Aluminate Corporation....1st Cover
National Safety Council, Inc....632
Naylor Pipe Company....654
Norton Company.....
Nugent & Company, Inc., Wm. W.....

Ohio Injector Co., The....556

(Continued on facing page)

Oliver United Filters, Inc. 585
Owen Bucket Company, The 665

Paisley Products, Inc. 570
Palmer Filter Equipment Company .....
Paper & Industrial Appliances, Inc. 634
Papermakers' & Merchants' Directory of All Nations 659
Perfecting Service Company .....
Perkins & Son, Inc., B. F. 587
Permutit Company, The 665
Pittsburgh Piping & Equipment Co. .....
Poole Foundry & Machine Co. 661
Powell Company, The Wm. 566
Pusey & Jones Corp., The 591

Rice Barton Corporation .....
Rice Barton Research Corp. 649
Rogers & Co., Samuel C. 665
Rohm & Haas Company, Resinous Products Division ..... 2nd Cover
Roots-Connersville Blower Corp. 657
Ross Heater & Mfg. Co., Inc. 568
R-S Products Corporation .....

Sandusky Foundry & Machine Co. 669
Sandy Hill Iron & Brass Works, The .....
Shartle Bros. Machine Co. 573
Shuler & Benninghofen 564
SKF Industries, Inc. 595
Smith & Winchester Mfg. Co. 660
Smith Corporation, A. O. .....
Solvay Sales Division, Allied Chemical & Dye Corporation .....
Squier Corporation, The 567
Standard Oil Co. (Indiana) 592
Stein, Hall & Company, Inc. .....
Stickle Steam Specialties Co. 667
Sutherland Refiner Corporation .....
Swenson Evaporator Company .....

Titanium Pigment Corporation 647
Torrington Co., Bantam Bearings Division 583
Turner Halsey Company .....

U.S.A.—Treasury Dept. .....

Valley Iron Works Company .....
Vanderbilt Co., Inc., R. T. 578

Waterbury & Sons Co., H. 673
Waterbury Felt Co., The .....
Western Precipitation Corp. 651
Weyerhaeuser Timber Co. .....
Whiting Corporation .....
Whitney Chain Company 569
Williams-Gray Company .....
Wyandotte Chemicals Corporation 653

Yarnall-Waring Company 575
Youngstown Welding & Engineering Co., The .....

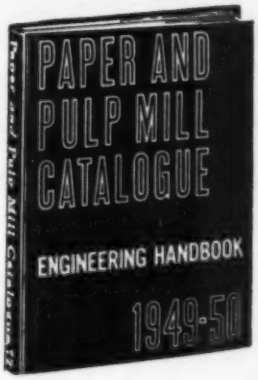
Professional & Business Services Section

Bjorksten Research Laboratories 672
Clark & Company, Wallace .....
Cohan, W. B. 672
Dreshfield, Arthur C. 672
Guest & Sons, C. M. 672
Wietk, Frederick 672

The 1949-50 Edition . . .

PAPER AND PULP MILL CATALOGUE Engineering Handbook

is in your mill office



The following firms catalogue their products in the 1949-50 edition.

Adell Chemical Company
Allington & Curtis Mfg. Co., The
Allis-Chalmers Mfg. Company
American Cyanamid Co. (Industrial Chemicals Div.)
American Defibrator, Inc.
American Paper Mach'y & Engr. Wks., Inc.
Appleton Machine Co., The
Armour and Company & Subsidiaries
Armstrong Machine Works
Arrow Tank Company, Inc.
Atkins and Company, E. C.
Aurora Pump Company

Bagley and Sewall Co., The
Bauer Bros. Company, The
Becco Sales Corporation
Beloit Iron Works
Bird Machine Company
Black-Clawson Co., The
Blaw-Knox Division (Blaw-Knox Co.)
Bowser, Inc.
Buckman Laboratories, Inc.
Buffalo Forge Company
Buffalo Pumps, Inc.
Bulkley, Dunton Pulp Co., Inc.

Cameron Machine Company
Carthage Machine Company
Cash Company, A. W.
Chemipulp Process, Inc.
Chicago Bridge & Iron Co.
Cincinnati Grinders Inc.
Cincinnati Milling Machine Co., The
Continental Foundry & Machine Company

Dean Brothers Pumps, Inc.
Dean Hill Pump Company
DeLaval Steam Turbine Co.
DeZurik Shower Company
Dilts Machine Works
Downingtown Mfg. Co.
Dresser Industries, Inc.
Duriron Co., Inc., The

Electric Steel Foundry
English China Clays Sales Corp.

Falk Corporation, The
Farrel-Birmingham Co., Inc.
Fitchburg Screen Plate Co., Inc.
Fleishel Lumber Company
Foote Bros. Gear and Machine Corporation
Foster Wheeler Corporation
Foxboro Company, The

Garlock Packing Co., The
General American Transportation Corporation
Gibbs-Brower Company, Inc.
Glens Falls Machine Works, Inc.
Goslin-Birmingham Manufacturing Co., Inc.
Graver Tank & Manufacturing Co., Inc.
Graver Water Conditioning Co.
Gruendler Crusher & Pulverizer Company
Gwilliam Company, The

Hardinge Company, Inc.
Harris-Seybold Company
Hauser-Stander Tank Co., The
Hendrick Mfg. Co.
Hermann Mfg. Co., The
Hewitt Machine Co., J. W.
Hewitt Transmission Co.
Hills-McCanna Company
Holyoke Machine Company
Hudson-Sharp Machine Co.
Huss Lumber Company

Improved Paper Machinery Corporation
Infilco Inc.

James Gear Mfg. Co., D. O.
Jeffrey Mfg. Co., The
Johns-Manville
Johnson & Carlson
Johnson Corporation, The
Jones & Sons Company, E. D.
Jones Foundry & Machine Co., W. A.
Joy Manufacturing Company

Kalamazoo Tank & Silo Co.
Kingsford Foundry & Machine Works

Ladish Co.
Langston Co., Samuel M.

Lawrence Machine & Pump Corporation
Leader Iron Works, Inc.
Link-Belt Company

Mason-Neilan Regulator Co.
Maxson Automatic Mach. Co.
Merrick Scale Mfg. Co.
Michigan Pipe Company
Midwest-Fulton Machine Co.
Moore & White Co., The
Morris Machine Works
Moyno Pump Div., Robbins & Myers, Inc.
Murray Mfg Co., D. J.

National Aluminate Corp.
Naylor Pipe Company
Nichols Engineering & Research Corp.
Noble & Wood Machine Co., The
Northern Engineering Works

Ohio Grease Company, The

Paper and Industrial Appliances, Inc.
Perfecting Service Company
Perkins & Son, Inc., B. F.
Portland Copper & Tank Works, Inc.
Posey Iron Works, Inc.
Pusey & Jones Corp., The

Record Foundry & Mach. Co.
Research Corporation
Rice Barton Corporation
Rice Barton Research Corp.
Robbins & Myers, Inc.
Ronningen Engineering Sales
Roofing Machinery Mfg. Co.
Roots-Connersville Blower Corp.
Ross Engineering Corp., J. O.
R-S Products Corporation

Sandy Hill Iron & Brass Works, The
Sarco Company, Inc.
Seybold Division, Harris-Seybold Company
Shartle Bros. Machine Co.
Simpson Co., The Orville
Smith Corporation, A. O.
Spraying Systems Company
Sprout, Waldron & Company
Stebbins Eng. & Mfg. Co.
Swenson Evaporator Company
Syco Manufacturing Corp.

Taylor-Stiles & Company
Toledo Scale Company
Trimbey Machine Works
Tube Turns, Inc.

Valley Iron Works Company

Waldron Corporation, John
Wallace & Tiernan Co., Inc.
Warren Steam Pump Co.
Whiting Corporation
Wiley Alloy Tube Company

Yarnall-Waring Company

Mention the PAPER AND PULP MILL CATALOGUE *when making inquiries.*

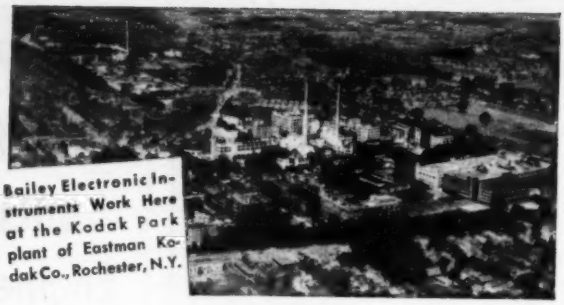
Published by

Fritz Publications, Inc.

59 East Van Buren Street — Chicago 5, Illinois

Also publishers of THE PAPER INDUSTRY.

Bailey Electronic Instruments Work Here at the Lake Charles, La. plant of the Mathieson Chemical Corp.



Bailey Electronic Instruments Work Here at the Kodak Park plant of Eastman Kodak Co., Rochester, N.Y.

alkali OR FILMS

Bailey Electronic Instruments Work Here at the Chillicothe, Ohio Mill of the Mead Corporation.

Bailey Electronic Instruments Work Here at the Midland, Michigan plant of The Dow Chemical Company.

paper OR CHEMICALS

★ No matter what you process it will pay you to check into the Bailey simplified electronic control system.

With four basic circuits and eight basic component parts you can get more than 100,000 different electronic instrument and control combinations. Your problems of measuring and controlling flow, level, speed, pressure temperature, gas analysis, pH, conductivity, etc., can be solved by the right combinations of these 4 circuits and 8 basic parts.

You don't have to load up a stock room with parts. Bailey parts are interchangeable. What you used for the last combination is good for the next one when conditions in your plant change. You can save money, as others are doing, when you standardize on Bailey controls.

Bulletin No. 17 will show you how easy it is to install and use Bailey electronic controls. Write for your copy today.

•

you'll find Bailey Controls on the job

P-20

BAILEY METER CO.

1058 IVANHOE RD. • CLEVELAND 10, OHIO

Bailey Meter Company Limited, Montreal, Canada

Controls for the Process Industries

TEMPERATURE • FLOW • PRESSURE

GAS ANALYSIS • LEVEL • RATIO

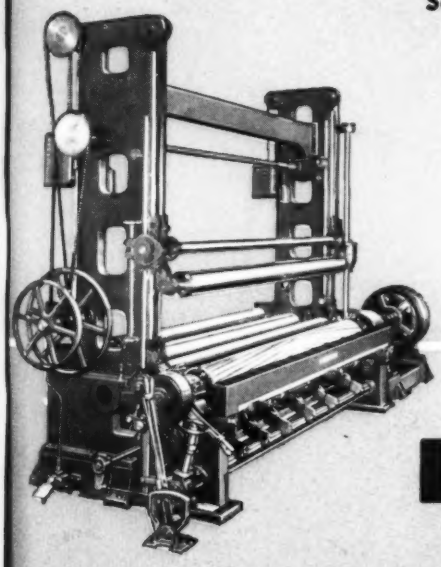
is this a LOKET?

No—in Czechoslovakia it's a man's hat.

The Loket is a varying unit of measure.

For precision and unvarying quality—a Langston Slitter and Roll Winder is tops in any language.

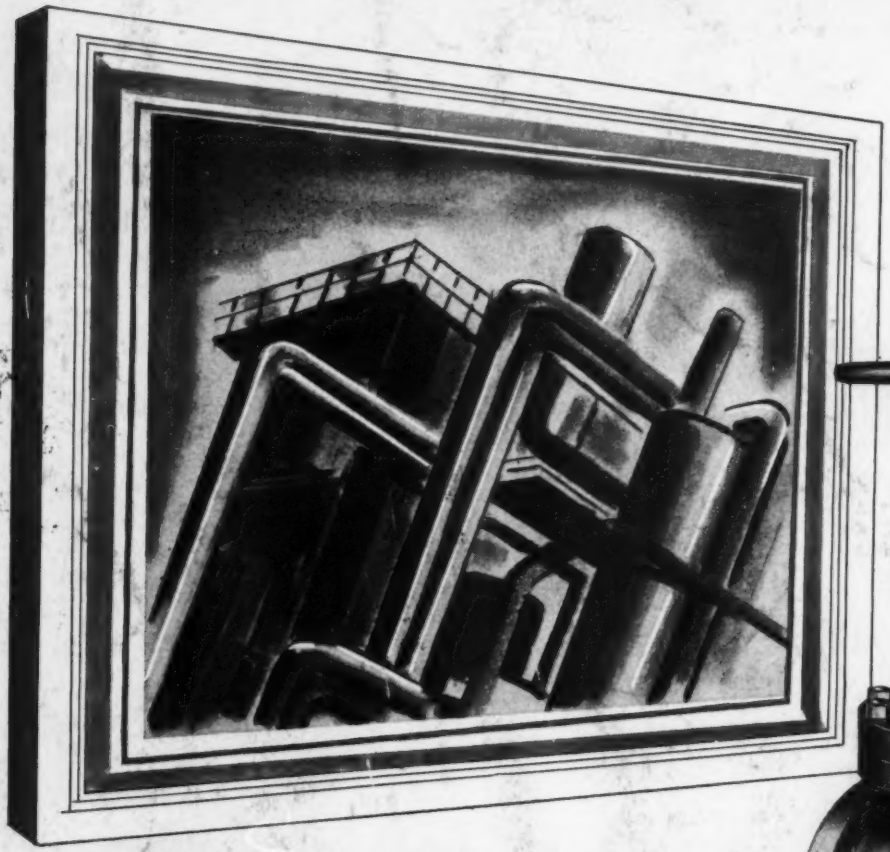
Samuel M. Langston Company,
Camden, New Jersey.

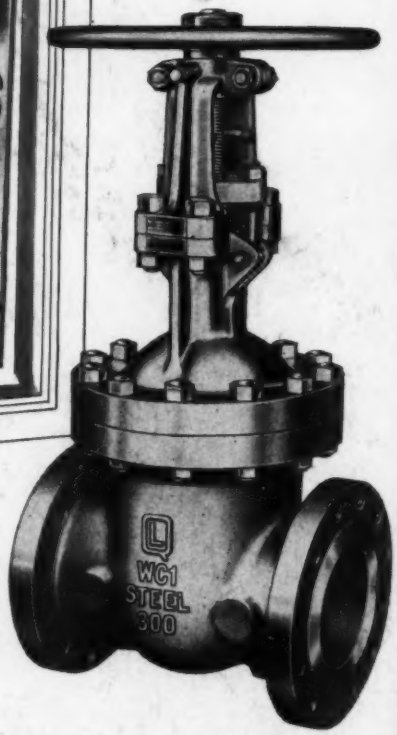


SLITTERS

Langston

ROLL WINDERS





LUNKENHEIMER "Service-Engineered" Steel Valves Will Meet YOUR SPECIFIC APPLICATION PROBLEMS

MAINTENANCE costs need specialized attention, these days—especially in your field, where steel valves are important. There's no cure-all for your valve maintenance problem. It has to be tackled an installation at a time — service by service — and that's where Lunkenheimer engineering comes in.

In the complex process field, valves must be *perfectly* suited to their service. If you fail to get a perfect match, your maintenance costs are bound to be high. From Lunkenheimer, you get not only valves designed with a service in mind, but exclusive features available from no other manufacturer. Investigate the new patented alloys developed through Lunkenheimer leadership in metallurgical research. See for yourself that all valves are *not* the same . . . that Lunkenheimer castings are denser and sounder, because of their special method of manufacture . . . that special Lunkenheimer trim is carefully selected for its service application . . . that stems, bodies, bonnets, gaskets, and even bolts are all coordinated and temperature-rated to give you the correct Lunkenheimer valve for your *specific* needs. Call in the Lunkenheimer representative in your area. He'll be glad to put at your command all the generations of successful experience behind Lunkenheimer's complete selection of "service-engineered" steel valves. For his address, write The Lunkenheimer Co., P. O. Box 360S, Cincinnati 14, Ohio.

STEEL • • • IRON • • • BRONZE

LUNKENHEIMER

THE ONE *Great* NAME IN VALVES

L-850-138